

# CASE STUDY

## Resolution of Nocturnal Enuresis and Vertebral Subluxation in a Pediatric Patient Undergoing Chiropractic Care: A Case Report & Review of the Literature

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### Abstract

**Objective:** To describe successful chiropractic care of a pediatric patient with nocturnal enuresis.

**Clinical Features:** A nine year old boy with nocturnal enuresis was presented for chiropractic care after unsuccessful medical approaches. Visual examination revealed several postural abnormalities. Motion palpation revealed vertebral subluxations in the cervical and lumbosacral spine regions.

**Interventions and Outcomes:** The patient was cared for with contact specific, high velocity, low-amplitude type thrust to sites of spinal subluxations. Proper dietary modifications were implemented as indicated as indicated from the patient's 7-day dietary intake form. By the seventh visit, it was reported that the patient had been enuresis free for two weeks which continued to be the case at a four month follow up; which deemed resolution of nocturnal enuresis.

**Conclusion:** The case of a nine year old male with past history of nocturnal enuresis is presented. Dramatic improvement is noted following the introduction of chiropractic care concomitant with a reduction in vertebral subluxation. Additional research on the benefits of chiropractic care and nocturnal enuresis is warranted.

**Key Words:** *Nocturnal enuresis, chiropractic, pediatric, vertebral subluxation*

### Introduction

In a large cohort of British children (N=13,973 singleton/twin infants), Butler and Heron<sup>1</sup> examined the frequency of bedwetting at 54, 65, 78, 91 and 115 months and found a decreasing prevalence rate of nocturnal enuresis (NE), from 30% at 54 months of age to 9.5% at 115 months; with the peak prevalence being most pronounced between 54 and 65 months of age.

In the United States, using a nationally representative sample of 8-11-year-old children (n = 1,136) who participated in the

2001-2004 National Health and Nutrition Examination Surveys, Shreeram and colleagues<sup>2</sup> determined the overall 12-month prevalence of NE at 4.45%, with boys being significantly greater at 6.21% compared to girls at 2.51%. Nocturnal enuresis therefore is a common condition among children and yet only one-third of parents with enuretic children seek conventional therapy.<sup>3</sup>

The utilization rates for complementary and alternative medicine (CAM) for children with NE remains unknown but given the continuing popularity and high utilization of CAM for children<sup>4</sup> in general, there is no doubt some of these involve children seeking CAM therapy for their

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child. Allopathic care approaches for NE include behavioral therapy, alarm therapy, and pharmacologic therapy.

According to Robson,<sup>5</sup> the evidence for the efficacy of many of these conventional therapies is weak. Beyond concerns by parents on the safety and efficacy of pharmacologic agents (i.e., tricyclic agents causing mood changes, nausea, sleep disturbance and even death)<sup>5</sup> or the inherent desire by parents, particularly CAM users, for CAM care for their children,<sup>4,6</sup> the multi-factorial nature of NE (i.e., NE has a genetic, urological, psychological, neurodevelopmental, and hormonal pathophysiology) lends itself to an integrative treatment approach that draws from both conventional and CAM therapies.<sup>7</sup> In the interest of evidence-based practice (i.e., to document the clinical expertise and the desire of patients for chiropractic care), we describe the successful chiropractic care of a child with NE.

## Case Report

### *Clinical Features*

The patient was a 9-year-old Caucasian male presented by his mother for chiropractic consultation and possible care for NE. According to the mother, the child had been a “bedwetter all of his childhood” with medical care being ineffective. His primary care physician did not prescribe any medications to address the problem but suggested withholding of water two hours prior to sleeping and waking him up every few hours to urinate. According to the mother, this care approach was ineffective.

At the time of consultation, the mother indicated her concern with her son’s self-esteem, as they had resorted to having him wear diapers to bed. Other notable history findings included a prescription of two year duration with Risperdal® for “suspected” bipolar disorder. When asked what motivated this prescription, the patient’s mother indicated that the child was easily distracted at school.

### *Chiropractic Examination*

Physical examination of the patient revealed a boy of stated age, 57 inches in height and weighing 100 lbs. Postural evaluation revealed the patient of endomorphic physique with enlarged breast tissue. His shoulders were rounded and stooped forward and noticeable pes cavus of the feet. Gait analysis revealed an “awkward” gait with collapsing of the middle arches bilaterally during the mid-stance phase. The patient also displayed genu varus and lower extremity antversion on gait analysis.

Further visual examination revealed possible hyperlordosis of the lumbar spine with compensatory hyperkyphosis of the thoracic spine. Active range of motion examination of the cervical spine was unremarkable with respect to restriction, pain, or asymmetry. The Gillett step test demonstrated bilateral fixations of the lower sacroiliac (SI) joints.

Motion palpation revealed intersegmental fixations at the C<sub>0</sub>-C<sub>1</sub> functional spinal unit, FSU, bilaterally with body right of the C<sub>7</sub> vertebral body, VB, relative to the T<sub>1</sub> VB. Tenderness and hypertonicity were also evident on digital palpation, static

and motion, at the paraspinal musculature at the C<sub>0</sub>-C<sub>1</sub> and C<sub>7</sub>-T<sub>1</sub> FSU’s. It was also noted at the lumbosacral paraspinal musculature bilaterally, from L<sub>1</sub>-L<sub>5</sub>, concomitant with a sacral base posterior subluxation and an L<sub>5</sub> VB subluxated body right.

### *Intervention*

With the mother’s permission, the patient received chiropractic adjustments characterized as Diversified Technique.<sup>8</sup> The C<sub>0</sub>-C<sub>1</sub> FSU fixation was adjusted with the patient supine using a first digit hand contact point on the left and with the patient’s head rotated contralateral to the side of contact. In a posterior to anterior (P-A) direction, a high velocity, low amplitude, HVLA, thrust was made. The body right C<sub>7</sub> -T<sub>1</sub> fixation adjustment was performed with the patient prone and the doctor standing on the patient’s left side.

Using a first digit hand contact on the side opposite of the right C<sub>7</sub> lamina, the patient’s head was stabilized to the right and an HVLA thrust was made on the segment in a P-A and right to left direction. The body right L<sub>5</sub> rotational asymmetry and fixation was adjusted with the patient in a side posture position on his left side. The hand contact point was a right pisiform on the left mammillary process of the L<sub>5</sub> segment and the thrust was P-A, right to left, and superior to inferior. The sacral base posterior was adjusted as a straight P-A HVLA thrust on the central S<sub>2</sub> spinous contact with the patient prone. The C<sub>0</sub>-C<sub>1</sub>, L<sub>5</sub>-S<sub>1</sub> FSU’s and both SI articulations were adjusted with good articular release and cavitation.

### *Outcomes*

Post-adjustment examination revealed greater occipital movement in the P to A plane and decreased hypertonicity at the cervicothoracic junction and lumbosacral paraspinal musculature. Motion palpation revealed improved articular mobility within the SI joints.

Given the positive response to the chiropractic adjustments, he was scheduled on a treatment frequency of once per week for the next 6-8 weeks - with the treatment frequency predicated on the patient’s response to care. The patient was also tentatively scheduled for orthotics screening to address his foot pronation at some time during his weekly visits.

The patient’s mother was also asked to keep a diary of her son’s diet for one week and fill out a standard office survey for nutritional analysis. The 7-day dietary intake form indicated the patient was on a “fast food” and processed food diet that included (on a regular basis) pizza, diet Coke®, processed meats, white flour products, candy, etc. The mother attempted to improve the quality of the dairy products by providing her son with “organic” dairy products such as milk and yogurt. There was very little raw vegetables or salad or even steamed or boiled vegetables in the patient’s diet.

The symptom survey indicated that there was a sugar handling stress on the patient’s system. Symptoms included hunger between meals, irritability before meals, afternoon headaches, moods of depression, worry, anxiety, apprehension and an increase in weight.

Based on the above findings and augmenting the chiropractic adjustments, the patient was recommended two supplementations manufactured by Standard Process, Inc, Palmyra, WI. Use of Calcium Lactate 3 was recommended twice a day and Chewable Catalyn 2 three times a day. The choice of the supplements was based on the diet survey and the clinical experience and judgment of the attending chiropractor as to what the patient required and would tolerate.

The Standard Process Chewable Catalyn product was designed to stimulate and support catabolism. The Standard Process Calcium Lactate product was an ionized source of calcium in a balanced ratio with an ionic source of magnesium. The patient's diet was determined to be lacking these nutrients.

Dietary changes included more spring water and elimination of soft drinks. Also implemented were raw vegetables every day in his diet. Throughout the course of care, his mother reported that he had been compliant with the dietary and supplement recommendations.

To address the bilateral foot pronation, the patient was fitted with orthotics on the 5<sup>th</sup> visit. An impression of the foot was obtained by the doctor with the patient seated. The ankle was held "tight" in the neutral position with the objective of capturing a capable arch. The orthotic was a ¾ inch length insert with longitudinal arch lift as well as heel cupping, made by Chiropod Inc, Sioux City, IA.

On the 6<sup>th</sup> office visit, his mother reported that he had been sleeping without nocturnal enuresis for the past six nights. On the 7<sup>th</sup> visit, it was reported that he had been enuresis-free for 2 weeks. This had been the longest dry period in the lifetime of the patient. Long-term follow-up at 4 months revealed continued resolution of NE.

## Discussion

### *Diagnosis*

Over the years, a number of classification systems and definitions of NE have been proposed. These involved the timing of enuresis, during the day or night, the presence of concomitant disorders like urogenital disorders, or the period of dry nights such as, a 6 month dry period prior to enuresis onset. According to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, DSM-IV, NE is "bedwetting for at least twice a week."<sup>9</sup> Note that enuresis is not considered problematic until the age of 5 years. In children with mental disabilities, they must have the mentality of at least a 4 year old before bedwetting is problematic.

According to Thiedke,<sup>9</sup> the diagnosis of NE at 5-6 years of age should have two or more bedwetting episodes per month and a child >6 years of age should have one or more wetting episodes per month. Notable history examination should focus on a family history of enuresis, birth trauma, and nervous system dysfunctions like neurogenic bladder.

### *Pathophysiology*

The pathophysiology of NE is multifactorial.<sup>10</sup> It may involve genetic predispositions when both parents were enuretic as

children, their offspring are said to have a 77% risk of having NE.<sup>11</sup> Bladder problems are also a factor, where extensive urodynamic testing has shown that bladder function falls within the normal range in children with NE.<sup>12</sup> Arginine vasopressin and sleep disorders may also be involved. Children with NE may be delayed in achieving circadian rise in arginine vasopressin leading to nocturnal polyuria that overwhelms the bladder's ability to retain urine until morning.<sup>13</sup> Parents report that their children with NE are "deep sleepers" compared with their non-NE offspring despite the finding of normal electroencephalograms.<sup>14</sup> Note that psychological factors were previously thought of as an etiological factor but recent findings suggest that children with NE do not have an increased incidence of emotional problems.<sup>15</sup>

### *Conventional Therapies*

A number of conventional therapy approaches exist for the child with nocturnal enuresis. Thiedke<sup>10</sup> provides an excellent review of the various conventional approaches to the child with NE. and recommend to the reader her review. (See Table 1) Of the various conventional therapies, the bedwetting alarm is considered the most successful therapeutic approach, when compared to other skill-based or pharmacologic agents. It has a success rate of 75% and a recurrence or relapse rate of 41%.<sup>16</sup>

### *Integrative Approaches*

Given the multifactorial nature of NE and the lack of superiority of one approach with respect to effectiveness, it stands to reason that the integrative model of healthcare, physical and psychological, conventional and alternative therapies, would be the approach to patient care. Culbert and Banez<sup>7</sup> discussed the integrative approach for a child who wets the bed. We draw upon their work to describe the alternative approaches to the child with NE. (See Table 1)

According to Culbert and Banez,<sup>7</sup> with an integrative approach, the principles of juris prudence<sup>17</sup> must be adhered to and involve:

- 1) A reinforcement of mind-body, brain-bladder, connections
- 2) Patients and their families benefit when their understanding of NE is increased and demystified
- 3) Positive expectations and reinforcement for dryness are created
- 4) Each child is an active participant in the process
- 5) The body's natural healing abilities are facilitated and promoted
- 6) Conservative care such as, the least invasive, most natural options, are utilized first and whenever possible
- 7) Factors such as time, cost, complexity, and patient preferences are considered

The non-judgmental, holistic and vitalistic approach to patient care, high patient satisfaction, and continuing popularity of pediatric chiropractic provides support that chiropractic is in-line with the principles of juris prudence.

## Review of the Literature

To further direct and provide context to our discussion on the chiropractic care of children with NE, we performed a review of the literature on the subject. Using PubMed [1965-2009], Index to Chiropractic Literature [1984-2009] and MANTIS [1965-2009]. Our selection criteria for review were:

- 1) the study was a primary investigation/report, (case reports, case series, case control, randomized controlled trials and survey or surveillance studies), published in a peer-reviewed English language journal;
- 2) part or all of the study population was 18 years or younger and;
- 3) the topic involved the chiropractic care of a patient with enuresis and related words such as “bedwetting” and incontinence”

Our literature search revealed 3 case reports,<sup>18-20</sup> one limited literature review,<sup>21</sup> one cohort,<sup>22</sup> one case series,<sup>23</sup> and one clinical trial.<sup>24</sup> We also found 4 case reports describing the care of patients with incontinence.<sup>25-28</sup> (See Table 2)

## Implications to Chiropractic Care

Despite the relative lack of literature documenting the chiropractic care of children with NE, a meta-synthesis of the existing literature provides for us a starting point for future research and possibly direct clinical care. What becomes apparent with our meta-synthesis are the following.

Patients with bedwetting problems typically have received medical care, the medical care was ineffective or parents wanted to pursue an alternative care approach under the auspices of integrative medicine. Parents do not withdraw medical care but add an alternative approach to their child's care. The physical examinations are unremarkable for an organic cause but from a chiropractic perspective, spinal subluxations are present in the lumbopelvic region as well as throughout the spine.

The approach to patient care is primarily with the chiropractic adjustment focused to the lumbopelvic region but as is common in 80% of the profession,<sup>29</sup> a full spine approach is performed. The chiropractic adjustment is augmented with various care approaches, such as dietary modifications to address the presenting complaint in addition to providing overall wellness care as demonstrated in this case report.

Specific to the case presented, according to the attending clinician, it was his clinical opinion that the greatest impact on the patient's condition was the chiropractic adjustment. Consider that the dietary intervention did not come into play until after the first month of care. The patient's clinical condition took a “turning point” after the second visit where the sacral base posterior adjustment resulted in a dramatic articular release.

By the third visit, the patient's mother reported “some dry nights” and by the fourth visit, the patient had dry nights. The patient was scheduled for another 6 visits thereafter to address

mild fixations at the C<sub>0</sub>-C<sub>1</sub> FSU and to address a sacral base posterior. Further dietary advice was given with the goal of eliminating processed foods, fast foods, and soft drinks from the diet of the patient.

As with all case reports, we caution the reader on making inferences of cause and effect and generalizations from the case presented. A number of competing explanations exist to attribute the salutary effects reported in the case presented. These competing explanations include: (a) the natural history, (b) regression to the mean and (c) the placebo effect. Additionally, (d) the demand characteristics of the therapeutic encounter and (e) subjective validation may also have contributed to the successful outcome described.

With respect to the natural history, primary NE is said to have a remission rate of 15% in children >6 years of age. The prospective cohort study by LeBoeuf and colleagues<sup>22</sup> reported “less favorable than the therapeutic success of other common types of therapy.”

Reed and colleagues<sup>24</sup> in a clinical trial of 46 enuretic children found 25% of the children in the treatment-group had a 50% or more reduction in the wet night frequency from baseline to post-treatment while none among the control group had such reduction. The study by Reed and colleagues however was fraught with research design issues.<sup>30</sup>

Van Poecke and Cunliffe<sup>23</sup> in a prospective cohort study, reported 22 of 33 children receiving the NeuroImpulse Protocol had resolution in their primary NE 12 months following initiating care. It is a technique derived from toggle recoil and Logan Technique.

## Conclusion

This study suggests that children with NE may benefit from a combination of chiropractic care characterized as HVLA thrusts to sites of spinal segmental dysfunction and clinical nutrition. We advocate further research in this field.

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**Table 1. Non-allopathic approaches to the patient with nocturnal enuresis<sup>7</sup>**

Alternative Approach	Commentary
Hypnosis	Children are highly prone to hypnotic susceptibility and are said to be excellent candidates for learning self-hypnosis/mental imagery techniques for a variety of childhood disorders, including NE.
Acupuncture	Acupuncture is based on the premise of restoration of health by removing energy imbalances and blockages. Modulation of endogenous opioids and/or autonomic nervous system effects have been shown with acupuncture.
Energy Ultrasound	In 27 patients with NE, ultrasound combined with irradiation and heating was applied over the lumbosacral region over 10 daily sessions, found some benefit.
Diet	Restriction diet may be helpful for NE due to their possible precipitation and/or exacerbation by food allergies, insensitivity, or intolerance. The thinking is that NE for some may be linked to dietary responses that provoke bladder instability.
Homeopathy	Specially prepared dilute remedies for NE, include preparations of belladonna, causticum, equistem, ferrum phos, lycopodium, pulsatilla, and sepia.
Herbs	<p>In the Papyrus Ebers from 1550 BC, treatments for NE consisted of “cypress, juniper berries, and beer.” Trousseau in 1870 recommended belladonna, and if failed, recommended strychnine and stinging nettle.</p> <p>Herbalists also suggest St John’s Wort (<i>Hypericum perforatum</i>), infusions of horsetail, or corn silk (<i>Zea mays</i>) given throughout the day to encourage normal nervous control of the bladder. Others suggest agrimony (<i>Agrimonia eupatoria</i>), American cranesbill (<i>Geranium maculatum</i>), ladies mantle (<i>Alchemilla vulgaris</i>) and parsley (<i>Penloselinum sativum</i> Hoffin).</p> <p>An Ayurvedic perspective on NE suggests that herbal remedy for children called shilajit may be useful and that sesame seeds can be given to balance vata.</p>

**Table 2. Review of the literature on the chiropractic care of patients with nocturnal enuresis**

Reference	Description
Gemmel et.al. <sup>18</sup>	A 14-yr-old male with chronic NE. Treatment rendered was Toggle Recoil at the L <sub>5</sub> /S <sub>1</sub> FSU. Interestingly, withdrawal of treatment resulted in worsening of NE symptoms whereas re-initiation of chiropractic care abated NE.
Blomerth <sup>19</sup>	An 8-yr-old male suffering from NE at 6-7 nights per week received adjustments to the lumbosacral spine and dietary modification with successful outcome.
McCormick <sup>20</sup>	The patient was a 10-yr-old girl with “chronic bedwetting” at 1-2 times per night for the last 12 months. Chiropractic examination revealed restrictions at the C <sub>7</sub> -T <sub>1</sub> FSU bilaterally; L <sub>1-2</sub> FSU & SI joints bilaterally. At 6 months follow-up, NE was variable but better than prior to chiropractic care.
Kreitz and Aker <sup>21</sup>	In their review of the literature on the subject, the authors advice that treatment should be individualized following the principles of evidence-based practice.
Leboeuf et.al. <sup>22</sup>	Through newspaper and school contacts, a cohort of 171 enuretic children were treated with Diversified Technique. By the end of the study, only 25% of the cases were defined as successes and when compared to the 50% success rate of other conservative interventions – the authors concluded that this study does not support the side of chiropractic.
Reed et.al. <sup>24</sup>	Comparing the response of enuretic children under chiropractic care (i.e., Palmer Package vs. Sham using an Activator Instrument). Baselines measures of bedwetting were measured for the first two weeks followed by 10 weeks of care. No change from pre-treatment to post-treatment in the number of wet nights per every two weeks was reported by the authors.
Van Poecke and Cunliffe <sup>23</sup>	In a 3-year period, 33 children with NE were cared for with the NeuroImpulse Protocol. Compared with baseline wet nights frequency, 22 of the 33 showed resolution of NE 12 months after beginning of chiropractic care.
Borregard <sup>25</sup>	An 13-yr-old male with bilateral knee pain, urinary tract infection, daytime incontinence, and NE was reported. Radiographs revealed lumbarization of the S <sub>1</sub> VB. Chiropractic care consisted of Pelvic Blocking and Respiratory Assist Manipulation, stretching, and isokinetic exercises. The knee pain was relieved in 1 week, the restoration of SI joint function resulted in sense of bladder distention ½ hour before needing to void.
Valone <sup>26</sup>	The case involved the successful care of a 7-year-old female with urinary tract infection of 24 months duration. Unlike traditional antibiotic therapy and homeopathic remedies, chiropractic care was successful.
Stude <sup>27</sup>	The patient was a 12-yr-old girl with history of low back pain and “intermittent urinary incontinence” described as “leaking.” Chiropractic care was successful.
Garnecky and Canty <sup>28</sup>	The patient was a 13-yr-old male with urinary incontinence and Cerebral Palsy. The incontinence occurred since birth at 5 times per day in the past 11 years only during the day due to lack of bladder control. The patient received care in the form of Diversified Technique, SOT blocking, Activator, and Toggle-Recoil. The patient did not respond until an intra-rectal technique was initiated.