CASE STUDY

Resolution of Defiant Behavior and Improved Speech in a Non-Verbal Toddler Following Reduction of Vertebral Subluxation: A Case Study

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Abstract

Objective: To report on the positive health outcomes following chiropractic care of a 3-year-old who presented with behavioral and learning issues.

Clinical Features: A 3-year-old female who experienced vertebral subluxations, communication issues (non-verbal) and defiance-like behavioral issues saw improvement with chiropractic care. Medical interventions, such as speech therapy failed to make significant improvements.

Interventions and Outcomes: Sustained contact adjustments were applied to various spinal segments where vertebral subluxations were present. The patient's parent reported improvement in behavior and communication skills.

Conclusions: The chiropractic care of a patient with behavioral and learning issues is presented. Significant improvements of the patient's multiple conditions and symptoms were seen following chiropractic care. The results of this case study attest to the usefulness and benefits of chiropractic care. Further research is warranted.

Keywords: *Behavioral, learning disability, pediatric, chiropractic, vertebral subluxation, adjustment, spinal manipulation*

Introduction

Pediatric chiropractic care is a misunderstood concept, which makes explaining its benefits and safety to parents challenging. This becomes more difficult as many children present with multiple symptoms, both musculoskeletal and non-musculoskeletal. In an effort to report on chiropractic benefits within the pediatric population, this case describes the successful chiropractic care of a patient with multiple co-morbidities.

For the patient in this case these include being non-verbal, problems with social connections both mentally and physically even with family and inability to regulate emotions to the point of defiance-like behaviors.[1-3]

Chiropractic has a direct effect on the brain and a person's neurology every time they receive a chiropractic adjustment that removes vertebral subluxations. Chiropractors believe that subluxation is an adaptation that results from demands exceeding the ability of the body to process increased stressors (whether they be physical, chemical, or emotional); and this subluxation can result in an increased stress response and an altered afferent input to the brain from the body.

As the brain responds to the stimulus, the response will be to the information received (altered input) and may not be appropriate for the situation (altered output).[4-5] Therefore, behaviors can be an insight to how a child is developing and integrating information about their world. Behaviors that are expressed via the autonomic nervous system are conveyed in

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different ways; the child either feels safe and can respond appropriately or they go into a state of fight-flight-freeze where behaviors can be irrational, or a child can totally shut down. This is based on the input perceived by the brain.[4,6] Defiant behavior is defined as when a child starts "acting out" persistently. These behaviors can include emotional outbursts, being angry, and being non-compliant with parents.[7]

Defiant behavior can be defined as either being "Bottom- up" or "Top-down". A bottom-up behavior does not have conscious thought, it is reflexive, and an automatic response. Top-Down behavior involves more conscious thought, control over impulses, ability to reflect on actions, and can develop over time. Many times, parents think their child is "acting out" on purpose, however this might not always be the case especially in a very young, stressed child.[7-10]

Under stressful circumstances a child can undergo *dysmaturation* of an immature autonomic nervous system (ANS), causing changes in how higher-level cortical functions are supported. This dysmaturation of the ANS can affect the connections with the brain's limbic structures that are involved with mood, memories, and emotional states of regulation.[8] The autonomic nervous system is activated three ways; via the dorsal vagal system, the sympathetic nervous system and ventral vagal system.

The dorsal vagal systems job is to provide protection by "shutting down" a person. Meaning if the body is under too much stress and not adapting, the body will "shut down" to protect itself. In a child this can look very different than an adult; not communicating and withdrawing (physically and mentally) are signs of this activation. Along those same lines, sympathetic activation of the autonomic system in a child means they are in a "fight-flight-freeze" state.

This sympathetic activation can very much seem like purposeful defiant behavior even when it is not. The ventral vagal system helps to support a person through social engagement and connection and is not well developed in young children. If a person's autonomic nervous system is being activated in multiple ways, which in a stressed child could happen, then many of the "symptoms" they present with may be the consequence of that activation.[4,9]

If increased demand (physical, chemical, or emotional stress) is placed on a child in a capacity that the child is unable to meet, a response or adaptive change can happen in the body; a subluxation. The neurological, structural, and mechanical response as a result of the subluxation can be measured and observed through postural changes, range of motion alterations, muscle tone changes, leg length and paraspinal thermography readings.[11]

The articular dysfunction component of the vertebral subluxation results in altered afferent input to the central nervous system (CNS) that modifies the way in which the CNS processes and integrates all subsequent sensory input. This processing (i.e. sensorimotor integration), is a CNS function that appears most vulnerable to altered inputs.[11-12] These altered inputs can affect how the body interprets touch and processes communication, which can be a factor in how a child reacts and responds to their surroundings. The following case is about a child that had some communication (expressive and receptive language) and behavioral issues.

Informed consent for care and research was obtained for the patient and documented along with IRB approval for a case study.

Case Report

History

The patient was presented to a health center by her mother after she became non-verbal and displayed defiant-like behaviors which started suddenly at the age two. After becoming non-verbal the patient had dramatic increases in emotional outbursts which included defiant-like behaviors and was unable to connect with family members. When the patient first came to the health center, she was three and had been going to speech therapy for a little over six months after becoming non-verbal, with little progress noted by the mother.

The mother was concerned about her speech and the ability for her to connect with family members. Patient was unable to make social connections, verbally, emotionally, and physically. Patient had also developed defiant-like behaviors, causing stress to the family with her frequent emotional outbursts.

Examination

During the first few chiropractic visits, she would cry, throw a tantrum, and was nervous about being touched for a spinal check and leg checks.

The focus of the spinal exam was the upper cervical region of the spine. The exams were done to patient tolerance since she did not like to be touched.

Methods

1. Tytron Fossa thermography (pre and post)
2. Leg checks (pre and post)
3. Static, muscle, motion palpation (pre and Post)
4. Active range of motion of the cervical and lumbar spine (initial and re-evaluations)
5. Parent survey (initial and re-evaluations)
6. Cervical adjustments were performed per health center protocol in the seated position
7. Examiners included chiropractor and chiropractic intern

Thermography scan assesses the autonomic nervous system by measuring temperature on the skin overlaying the paraspinal muscles, it detects differences in the temperature between the spinal segments and compares one side to the other. This skin has both blood vessels and nerve fibers supplying it. Thermoregulation is controlled by autonomic nerve impulses. This system is both anatomically and physiologically symmetrical, therefore spinal findings should have symmetry from side to side.[13]

Interventions and Outcomes

The patient received chiropractic care at the frequency of once a week for 10 weeks in the initial plan of care with a second care plan continuing at one a time a week for another 10 weeks, using the health center protocol for subluxation-based chiropractic care. Correction of subluxation was performed according to the health center protocol with sustained contact in a seated or supine position for cervical adjustments. Changes in thermography fossa readings, leg length visual observation in both prone and supine positions, also other analysis findings (static, muscle, and motion palpation), comparing pre-adjustment and post-adjustment findings.

Per the parent survey improvements in the following areas were noted: *(See chart Table 1)*

- Getting to Sleep
- Quality of Sleep
- Amount of sleep
- Ability to concentrate on a task/goal
- Vocabulary and Expression
- Understanding concepts
- Attention and Focus
- Mood (Self Esteem)
- Anxiety
- Family relationships
- Emotional Outbursts
- Ability to self-regulate emotions

Mother reported the patient had been better behaved (see parent survey) and was starting to communicate more appropriately for her age and patient is no longer displaying defiant like behaviors.

Discussion

Patient presented with defiant-like behavior and non-verbal communication issues. Patient had been seeing a speech therapist for some time with only a little improvement noted by the mother. Since patient is a young child, they were adjusted via sustained contact adjustment pressure.[14] Adjustments were performed utilizing this sustained contact method in the upper cervical region.

A possible benefit of this study is to build upon prior knowledge of adjusting children. The primary goal for chiropractic care in this study was to deliver specific vertebral subluxation-based care following clinic protocols. The subluxations found in the upper cervical region were associated with alterations that may have contributed to the patient's behavior and speech issues.

This study also affirms that the patient has retained improvements after care.

In this report, an observed change in prone leg length and change in fossa, was noted following the correction of vertebral subluxation, this suggests a neurological change occurred post adjustment. The patient also exhibited improved segmental mobility in her cervical spine post adjustment. Correction of vertebral subluxation was concomitant with improvement in defiant like behaviors and improving patient verbal communication skills.

Conclusion

Initially this patient displayed defiant-like behaviors and speech development issues. She was able to start communicating and connecting with her family, loved ones and world with no complications following the delivery of chiropractic care.

It is essential for practitioners to be aware of any underlying presentations that may affect caring for a patient. Defiant-like behaviors and speech issues are both becoming more common issues in children as our world becomes more stressful and we demand more of kids.[15-17] It is recommended that additional research be conducted, such as a clinical trial that would help gauge effectiveness of chiropractic and these issues in children.

The possible benefit of this study contributes to the current knowledge of adjusting pediatric patients with behavioral and learning issues. The principle aim for this study is the correction of vertebral subluxation using the Sherman College protocols. Subluxations when found were corrected. The reduction of vertebral subluxations proved successful in reducing the frequency of emotional outbursts, improvement in speech, and ability to connect with family members. Since this is a case study, no claim of cause-and-effect can be made.

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Appendix

Table 1. The following table shows improvements gathered from the parent survey from the start of care through two care plans.