CASE STUDY

Resolution of Eczema, Ear Infections & Balance Problems in a Boy Undergoing Chiropractic Care to reduce Vertebral Subluxation: A Case Study & Review of the Literature

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Abstract

Objective: This case study describes the improvement of eczema, ear infections and balance in a 28-month-old boy under chiropractic care.

Clinical features: A 28-month-old Caucasian male was presented by his mother for chiropractic care with a chief complaint of eczema. He also had ear infections and balance problems. The child had a persistent rash since the time of his first birthday. The mother tried numerous emollients and lotions without success to help with the intense pruritus he experienced.

Intervention and Outcomes: Subluxation-focused chiropractic adjustments were administered at 27 visits over 3 months. The child was assessed using static palpation, motion palpation, and paraspinal surface electromyography. Adjustments were delivered through a diversified chiropractic technique. At his 3-month re-assessment, his mother reported his eczema to be gone. The patient remains under regular chiropractic care and experienced one other eczematous outbreak over the following 3 years. His ear infections resolved and his balance improved.

Conclusions: This study details relief of symptomatology associated with eczema, ear infections and balance in a child under chiropractic care. More research is needed to establish the role of chiropractic in the management of these children.

Key Words: *Eczema, atopic eczema, atopic dermatitis, dermatitis, chiropractic, subluxation, pediatric, ear infections, balance, adjustment*

Introduction

Eczema is a chronic inflammatory skin disease that affects millions in the western world. Studies report that 2-3% of the adult population and between 10-20% of children in these developed nations had or have eczema.[1-6] The disability-adjusted life year, which is a standard that measures overall disease burden, ranked eczema first of all common skin diseases.[7] Skin diseases can place significant psychological stress on the individual due to the visibility of the lesions, which are often stigmatized as dirty or neglectful.[3,8-10] Mothers of children with eczema report a high level of stress, less support from social contacts, and reduced ability to work outside the home.[11]

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Eczema has been shown to be strongly associated with mental health disorders.[12-14] Sequela of eczema includes reduced sleep, itch, pain, social embarrassment, and inflammation.[3,10] Studies have shown that children with eczema have a significantly higher chance of developing behavioral issues.[3,14] The burden of eczema not only weighs greatly on the individuals and families affected, but also on the economy. Direct annual healthcare costs in the United States have been estimated at $5 billion.[2,3] Due to the vast number of people diagnosed with eczema, proper management of the disease is crucial for millions of patients, their families, national health-care expenses, and society as a whole.

Eczema is more common in developed countries. Precipitating factors may include: small family size, diets high in sugar and

poly-unsaturated fatty acids, high household education levels, health insurance, urban living, decreased ultraviolet light exposure, environmental toxins, increased hygiene, and cleaner indoor living environments.[1,2,4,6,10,15-17] Early use of vaccinations and antibiotics also contribute to the development of eczema by reducing early exposure to infections and allergens that contribute to tolerance to certain antigens.[15,17] Exposure to microbes at a young age primes future immunological response, therefore restricting exposure to infectious disease may skew the child's adaptive immune response. Eczema can appear at any age, but in nearly 60% of cases, it begins during the first year of life.[17,18]

Eczema causes chronic inflammation of the skin and is manifested by erythema, papules, scaly plaques, and pruritus.[2] The stratum corneum of the epidermis is a strong barrier that mediates water loss as well as acts as a physical barrier to allergens.[1,4,8] This protective skin layer is made up of corneocytes, which normally contain high amounts of natural moisturizing factor to attract water to maintain hydration. Breakdown of the structural integrity of this outermost skin later leads to water loss and the entry of irritants through the skin.[1,4]

There is no specific test to diagnose eczema, therefore, it is identified by the clinical characteristics of history, morphology, and distribution.[3,16] The American Academy of Dermatology requires that pruritus and a characteristic skin lesion be present to meet diagnostic criteria.[16] The rash pattern must be chronic or of relapsing history and includes facial, neck, and extensor involvement in infants/children; current or previous flexural lesions; and sparing of the groin and axillary regions.[16]

Case Report

History

A 28-month-old Caucasian male was presented by his mother for chiropractic consultation and possible care with a chief complaint of eczema, ear infections, and balance issues. The eczema was first noticed when the child was approximately twelve months old. The mother described his eczema as being mostly left-sided and most severe behind the knee. She reported that the rash would appear at the elbow at times during an intense flare-up. The mother stated that she could not pinpoint anything that made the rash better or worse. She reported that the pruritus was so intense that he would scratch to the point of breaking through the skin. The rash would turn scaly through the duration of its course.

No prescriptions were administered for this condition, and the mother applied the lotions Cetaphil, Aveeno, and Aquaphor to his skin for the dryness. In conjunction, he had a constant, colorless, raised rash on his trunk, back, and under his arms. The mother denied a family history of eczema. The child had no known genetic disorders or food intolerances or allergies.

His mother disclosed that during pregnancy she received one ultrasound and had an uncomplicated delivery. The patient was born vaginally without the use of forceps or vacuum extraction. At birth the patient weighed 8lbs 9oz and was 22 inches long. The mother reported that she broke out in a generalized, full body rash during her second trimester, and the rash remained until the beginning of the third trimester. The mother also reported a staph infection during her pregnancy, which was treated with a round of antibiotics. The child was exclusively breast-feed until three months and then switched to Similac formula for the next three months. At six-months, solid foods were introduced. At the time of presentation, he had consumed one prescription of antibiotics in the previous six months and two total antibiotic prescriptions in his lifetime, both for ear infections. The mother expressed dissatisfaction with care being provided by his pediatrician.

Chiropractic Examination

The physical examination began with a paraspinal surface electromyography (SEMG) assessment of the child. Paraspinal SEMG measures and records electrical potentials produced when paraspinal muscles contract.[19] Paraspinal muscle dysfunction, an indicator of vertebral subluxation, is detected by the SEMG.[19] Abnormal paraspinal muscle activity may be due to nerve root involvement.[19] SEMG quantifies aberrant paraspinal contraction in a reliable, objective manner.[19] The amplitude of paraspinal electrical activity at selected segments is compared to a normal population. Paraspinal tone is classified into mild elevation of tone, moderate elevation, high elevation, or reduced muscle tone compared to normative data. The patient's assessment revealed high tone at C1, C3, C5, C7, and T1 vertebrae (See Figure 1**)**. After the SEMG assessment, the patient's first visit was concluded and the physical examination was resumed the following day.

Static and motion palpation were performed on the child to evaluate regions of the spine for reduced range of motion, asymmetry of musculature, and muscle spasm. Palpation was also utilized to evaluate for signs of swelling, inflammation and abnormal temperature, joint pain, and tissue tenderness, all of which may indicate areas of vertebral subluxation. Motion palpation monitors relative displacement of vertebrae and findings are categorized as being limited, excessive, or aberrant.[20] Motion palpation has been found to be a favorable method to determine the site of care, with some limitations, depending on the region of spine being palpated.[20] Palpation of the child revealed restricted lateral to medial motion and left prominence of the atlas on the first visit.

Intervention

The patient received 27 adjustments over a three-month time period, at a frequency of two visits per week. The patient consistently presented with a left lateral atlas and left sacrum subluxation. The left lateral atlas was adjusted on 20 of these visits and the left sacrum was adjusted on 12 of the visits. Other segments that were adjusted during care were: right lateral atlas, occiput, right sacrum, L2 vertebrae, and the pelvis.

The analysis for subluxation in the cervical spine was through static and motion palpation of the cervical vertebrae looking for reduced joint motion, vertebral malposition, muscular hypertonicity, and edematous changes. The left lateral atlas misalignment was corrected with the patient prone using the Activator II Adjusting Instrument (AAI). The doctor stood on

the left side of the patient and contacted the superior-lateral portion of the atlas transverse process. He adjusted the segment with the Activator in a left to right, superior to inferior line of correction.

The lumbar spine was analyzed through prone motion and static palpation looking for reduced joint motion, vertebral malposition, muscular hypertonicity, and edematous changes. The lumbar listings were posterior malpositions, so the doctor contacted the posterior-inferior portion of the involved spinous process and adjusted in a posterior to anterior, inferior to superior line of drive.

The pelvis and sacrum were analyzed according to the Thompson Terminal Point Technique. This technique utilizes prone leg checks in full leg extension and determines subluxation location based on the relative change in leg length with the leg position in 90 degrees of leg flexion.[21] The short leg in position one (leg extension) is noted and the subluxation listing is determined by the comparative length of the original short leg in position two (legs in 90 degrees of flexion). A short leg in position one that stays short or becomes shorter in position two is categorized as a Derifield negative (D-).

A short leg in position one that balances or crosses over in position two is categorized as a Derifield positive (D+). A D- listing is associated with an anterior-inferior sacral base on the side of the original short leg. A D+ listing is associated with a posterior-inferior pelvis on the side of the original short leg.[22] The short leg observed in position two may result from guarding responses produced by stretch reflexes involving asymmetry of anterior thigh muscle tone associated with pelvic asymmetry.[21] Neurological imbalance, a manifestation of vertebral subluxation, is thought to over-stimulate the paraspinal muscles, resulting in a contracted leg.[22]

All adjustments were delivered with the patient prone in the indicated line of correction with the AAI. The AAI delivers a consistent high-velocity, low force adjustment to the spine. The AAI delivers a vibration through mechanical stimuli to the spine with a frequency that matches the natural resonance of the body's tissue.[23] Less force is needed to deliver the adjustment when delivered at resonant frequency.[23] Resonant frequency forces cause vertebral movement that may be transmitted farther and possibly to a magnified degree.[23] The AAI was utilized for it's gentle and specific approach on the pediatric patient.

Outcome

After the adjustment of each segment, the doctor noted improvement in segmental motion. At the three-month re-assessment, the mother was asked to fill out a questionnaire about the child's improvement. She reported that his eczema was gone, that he had not had an ear infection since beginning care, and that his balance was 60% improved. At the six-month and twelve-month re-evaluation, the child had not had another eczematous outbreak, despite the relapsing nature of the disease.[16] The patient's mother committed to continued wellness care and 3 years later, the patient has had one eczematous rash during the entire duration of care.

Discussion

Background

Eczema can be classified into two forms: atopic and non-atopic.[1,10,15] The atopic (formerly called extrinsic), which makes up roughly 80% of cases, is an IgE-mediated response. The body responds to intruders by means of T Helper cells. One subset of T-Helper cells, T-Helper 2 (TH2) cells, respond via the action of antibodies, specifically IgE.[1-3,8,15,24]

Individuals with eczema, often have a skewed TH2 response and stimulate excess IgE antibodies, making the individual overly sensitive to otherwise benign triggers.[1,8,24] Between the two forms, children with atopic eczema are more likely to develop asthma in later life.[10] Non-atopic eczema (formerly called intrinsic) is not mediated by IgE and is not well understood.[10,15] A clinical review of atopic and non-atopic eczema found that the two forms have not been shown to respond differently to treatment.[10]

The two main risk factors for eczema are family history of atopy and a genetic mutation of the filaggrin gene.[2,3,15,16] Filaggrin is integral in the process of epithelial cornification, by linking keratin filaments together, which creates a tight physical barrier to the outside environment.[2,3] Filaggrin mutation is the strongest known genetic risk factor, yet most people with eczema do not carry the trait.[1,3] Filaggrin deficits expose the skin to epithelial barrier dysfunction as well as subclinical inflammation, increased skin permeability, and reduced irritant thresholds.[3]

Filaggrin mutations also play a role in impaired tight junction formation. Tight junctions of the stratum granulosum provides a second physical barrier to retain water and exclude unwanted microbes or allergens.[1,3] Similarly, filaggrin breakdown influences the pH of the skin; with this defect, the pH of the skin is higher, which may allow for colonization of bacteria, such as *Staphylococcus aureus*.[1]

One study reported that up to 90% of eczema patients have dysbiotic *S. aureus* colonization of the skin.[25] A breach in the first line of defense causes an innate immune response with detection of foreign material by toll-like receptors on keratinocytes and immune cells.[1] The body responds by releasing antimicrobial peptides, cytokines, and chemokines to destroy the invader.[1] Patients with eczema may have reduced adequate toll-like receptor function, leading to a limited defensive response and improper handling of the intruder.[1]

Triggers for eczematous flares may be food or airborne allergens, microbial colonization, topical products, stress, and extreme temperatures.[1,2,3,15] Identification of contributing factors to outbreaks and elimination of these triggers is key to disease management. It is important to note that only a minority of patients will have a reaction to direct application of the allergen to the skin, making the identification of exact triggers more complicated.[2] Half of children with eczema will have complete remission and half will experience outbreaks into adolescence or adulthood.[1]

Medical Management

There is currently no "cure" for eczema, therefore treatment is aimed at improved symptoms and long-term control.[3] The management of eczema requires a multi-pronged approach due to it's multi-faceted etiology. Skin barrier repair and skin hydration are addressed through warm-soaking baths followed by topical moisturizers or emollients.[1,3,2,25] To address the skin inflammation, topical anti-inflammatory medications, such as corticosteroids are used.[1,3,24,25] Low doses are used throughout maintenance periods, with higher doses used during flare ups.[1] If the eczema doesn't respond to topical steroids, topical calcinurin inhibitors are used, which dampen the activation of immune T-cells.[10,25]

As discussed earlier, many patients have high colonization rates of *S. aureus*, therefore bleach baths may be used during maintenance phases and antibiotics during breakouts.[1] Other sources report no clear evidence for the use of antiseptics.[3] Eliminating exacerbating triggers is also key to reducing the frequency and intensity. Pruritus, arguably the main symptom, causes additional insult to the area when scratched. Therefore, anti-histamine therapy may be administered to reduce the itch.[1] In moderate to severe cases of atopic eczema, systematic immunosuppressive agents like ciclosporin and azathioprine may be used.[10] Systemic drugs are reserved for severe cases due to the more significant adverse side effects associated with them.[10] If this standard approach fails to produce the desired effects, narrow-band ultraviolet B phototherapy has been successful in some cases.[3,10,26]

Alternative Approaches

Many parents do not accept the "control rather than cure" approach used mainstream medicine in the treatment of eczema, therefore turn to alternative treatment methods.[24] A report, published in Pediatrics, on 1911 completed questionnaires, showed that 11% of children used alternative therapies.[27] Chiropractic, homeopathy, naturopathy, and acupuncture together accounted for 84% of the total use.[27] Complementary and alternative medicine (CAM) utilization by children with eczema was analyzed and reported by the American Contact Dermatitis Society. There was a reported 46.9% utilization rate of alternative therapies by children in the United States.[6] The study showed that herbal therapy, vitamins, naturopathy, homeopathy, and traditional healing were the most commonly used alternatives.[6]

Analysis of the data showed that there was actually an association between increased CAM use and eczema prevalence.[6] A case study described how a combination of acupuncture and gluten-free diet were effective in the management of a woman with urticaria and eczema.[28] Acupuncture may play a role in decreasing the inflammation and itch associated with histamine, as well as decreasing IgE blood levels.[29] Traditional Chinese Medicine, with the use of herbal remedies to reduce immunological pathways involved in the condition, has been used as a more natural approach.[5]

The use of probiotics from eczema due to allergy to cow's milk has been shown to have a protective effect against eczema.[30] On the other hand, some healthcare professionals document that there is no convincing evidence that dietary supplements, natural oils, or homeopathy have any benefit.[3,24]

Review of Chiropractic Literature

The literature on the chiropractic management of patients with eczema is lacking. More research is required to establish the role that chiropractic has in the management of eczema. This case study, and others like it, will help to show that subluxation-based chiropractic care and the removal of nerve interference allows the body to heal and repair the skin lesions that characterize eczema. A review of chiropractic literature using the key terms: eczema, atopic eczema, atopic dermatitis, dermatitis, subluxation, and chiropractic produced two chiropractic studies.

A case study of a 14-month-old female diagnosed with dermatitis underwent Toftness technique.[31] At the first adjustment, large scabs and inflammation were noticed on the skin. By the third adjustment, the scabs reduced in size but the inflammation was exacerbated. At the tenth adjustment, the inflammation was reported 50% reduced and the scabs were gone. At the twenty-eighth adjustment, the scabs and flares on the skin were completely absent. The child was adjusted 33 times and subluxation was found in the sacrum on each visit.

At thirty of the adjustments, a cervical segment was adjusted in addition to the sacrum. The Toftness treatments were theorized to have affected the autonomic nervous system, which improve the immune system, leading to reduction in the dermatitis.[31] Toftness adjustments deliver a low force via a metered pressure applicator.[32]

Another case study of a 21-year-old female with eczema undergoing chiropractic care was found.[9] A system was created to quantitatively measure changes in her condition during care. Five categories were created with a sliding scale of 1 (no eczema) to 10 (extreme eczema), consisting of two objective and three subjective entries. The doctor rated excoriation and edema while the patient answered the following three questions: how itchy is it (pruritus), how do you feel, and do you feel ugly?

These five measures were taken bi-weekly and the patient was adjusted once per week. The patient was adjusted seven times using diversified technique, with subluxations found in the thoracic and sacroiliac areas. Soft tissue therapy was applied to the rhomboids and paraspinal musculature. Analysis of the fifteen entries of the five-category system revealed marked improvement in the eczema, especially in regards pruritus. The patient discontinued care and the symptoms of eczema seemed to be worsening.[9]

The child detailed in this paper received chiropractic adjustments alone, like the 14-month-old female receiving Toftness care, but unlike the 21-year-old female. Both children presented with sacrum subluxations through much of their care, while the adult female had primarily thoracic segmental dysfunction. The categorized system developed to monitor bi-weekly progress provided valuable information that would've been favorable to have for the other studies. All three cases detailed significant reduction in eczematous lesions to the skin while undergoing chiropractic care. It is recommended that further studies be performed to qualify and

establish the effectiveness of chiropractic adjustments with eczema symptomatology reduction.

Proposed Mechanism

A vertebral subluxation is any vertebra out of proper alignment in relation to the vertebrae above and below that occludes a foramen, produces pressures on nerves, interferes and interrupts the flow of mental impulse between the brain and body, and causes dis-ease.[33] The vertebral subluxation and it's components have been theorized and described by many.[34] Vertebral subluxation involves mechanical distortion of the spinal column causing nervous interference, producing dysfunction in the body.[34]

When the highly innervated intervertebral segments undergo biomechanical dysfunction, normal mechano-reception may be disrupted.[34] Aberrant sensory input to the central nervous system can lead to aberrant processing in the central nervous system.[34] The brain uses specific efferent pathways to the immune system for "guiding, controlling, and modulating" the body's immune response.[35]

Cohn's review of chiropractic and the neuroimmune connection described bi-directional between the nervous and immune systems, specifically mentioning that neuromodulators are released via nerves to orchestrate immune responses and that the immune system relays information back to the nervous system by neuropeptides.[35] There is increasing research that supports the connection between the immune system and neuroendocrine system.[36] The sympathetic nervous system plays a part in the function of the immune system through direct neurotransmitter release onto lymphoid tissue.[37]

As previously described, eczema is a chronic inflammatory skin disease that often involves a skewed T-helper immune response. Dysfunction in the nervous system, therefore, can directly affect the ability of the immune system to respond appropriately, even leading to overreactions and hypersensitivities.[35] The proposed mechanism of action is that the removal of vertebral subluxation allows the nervous system to more adequately direct the actions of the immune system to heal the eczematous lesions.

Limitations

The implications of the study are limited because it is a case study. There was no objective tracking of the pruritus, erythema, papules, or scaly plaques throughout care. There was no SEMG post-scans at the time of resolution, for comparison, because the doctor doesn't routinely re-assess with SEMG until 12 months of care.

Conclusion

This case study shows improvement in eczema in a two-year-old boy undergoing subluxation-based chiropractic adjustments. The child's mother reported his eczema to be completely gone after 27 adjustments with a diversified technique. This case adds to a very small body of literature on eczema and chiropractic. With the increasing prevalence of eczema in the United States and "control not cure" approach[24] that is the standard of care for eczema, there is a need for chiropractic care in children with eczema.

More research to show the effectiveness of chiropractic care is needed, however. Objective measures to track the changes in eczema presentation and progression are key to validate the role chiropractic has to play in the management of eczema.

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Appendix

Figure 1. A paraspinal surface electromyography assessment was performed on the patient. High paraspinal tone is observed at C1, C3, C5, C7, T1.