

CASE STUDY

Improvement in Learning and Speech Disorder in a Child with Vertebral Subluxations Undergoing Chiropractic Care: A Case Study

Ben Lerner, D.C.¹ Sheri Lerner, D.C.²

Abstract

Objective: To report on improvement in learning disorder and speech delay in a four year old child undergoing chiropractic care to correct vertebral subluxations.

Clinical Features: Four year old male with history of severe learning disorder and speech delay. Objective indicators of vertebral subluxation identified via palpation, thermography and radiographs.

Interventions & Outcomes: Pettibon chiropractic technique along with manual Diversified chiropractic adjusting directed at reducing vertebral subluxations in the cervical thoracic and pelvic regions were performed. Dietary modifications were also implemented.

Conclusion: The case of a four year old male with past history of learning disorder and speech delay is presented. Dramatic improvement in neurodevelopment is noted following the introduction of chiropractic care concomitant with a reduction in vertebral subluxation. Additional research on neurodevelopmental disorders and chiropractic is warranted.

Key Words: *Learning disorder, speech delay, neurodevelopmental disorders, chiropractic, vertebral subluxation, Pettibon technique, Diversified technique, thermography*

Introduction

According to the Merck Manual, learning disabilities are conditions that cause a discrepancy between potential and actual levels of academic performance as predicted by the person's intellectual abilities. There is an array of learning disabilities that range from difficulty understanding written or spoken words to difficulty with mathematical calculations.¹

However, they all interfere with the way a person understands, responds, and remembers new information. Unfortunately, it is usually not diagnosed until a child is of school age. The NIH states about one-third of children with learning disabilities also have attention deficit hyperactivity disorder which in turn makes diagnosis and treatment more complicated.²

Statistics show about 5% of school age children in the United States receive attention for learning disabilities, being more

-
1. Private Practice of Chiropractic, Celebration, FL, USA
 2. Private Practice of Chiropractic, Celebration, FL, USA

prevalent in boys.¹ The cause of learning disabilities is unknown, however, neurological deficits are present and some research has shown neuroplasticity to be an important factor.³ Neuroplasticity refers to the brain's ability to adapt functionally and structurally in response to learning and experience. The brain is where learning and development takes place throughout childhood and adolescence and this development is believed to be under genetic control,⁴ which may explain why children learn certain things in the order that they do. Any slowing down of brain development can lead to a learning delay, in this case, a specific learning delay, dysphasia. Causes of slow brain development include brain injury, low birth weight, head injury from falling, and birth trauma to name a few.

Traditionally, learning disabilities are managed through educational teaching programs that specifically focus on the area the child is struggling with. For example, if a child can read words but not understand what he or she reads then comprehension would be addressed.⁵ Interventions are designed by teachers and speech language pathologists to aid the child in the classroom. The purpose of this paper is to report a case showing successful chiropractic care of a child with learning disorders and speech delay.

Case Report

History

Patient is a four year old male who presented with a history of being diagnosed with a learning disorder and speech delay. His speech was impaired to the extent that others could not understand him.

He was not speaking when he first started school and his mother reported that this caused him to be constantly frustrated, and angry. The patient was previously under the care of a speech therapist. There was no family history of speech delay or any other conditions according to his mother.

He was born Caesarean section which was recommended by the obstetrician because his mother's first delivery was a Caesarean section. He was pulled out by his head and his mother reports that she remembers hearing him crying while he was still inside her.

He has one sister with no development issues and has above average intelligence. He received all of the recommended vaccines exactly as they are scheduled by the Centers for Disease Control and Prevention. He experienced one ear infection at three years of age and other than that he had no other illnesses.

Examination

Chiropractic examination included postural analysis revealing shoulder unleveling with the right shoulder higher than the left. There was pelvic unleveling with the right pelvis slightly higher than the left and a forward antalgic lean of the head indicating loss of the cervical lordotic curve. Bilateral weight scales revealed an 8 pound difference favoring the right side.

Thermal scanning was performed utilizing the Insight

Millenium Subluxation Station® which revealed severe thermal imbalance to the right from levels C2 through C6. (See Figure 1.)

Radiographs were taken and revealed the following. The lateral cervical x-ray revealed a 28 degree cervical lordotic curve indicating a 38% loss of the normal cervical curvature. The Atlas angle was 20 degrees indicating a decrease of 35.5%. There was 20mm of forward head posture noted. The Anterior to posterior cervicothoracic x-ray revealed mild left rotation of the skull and a mild right listing of the cervical spine. The AP lumbopelvic x-ray revealed a mild left listing of the lumbar spine with pelvic unleveling of 5mm with the right side being the high side. (See Figures 2-4)

Diagnosis included vertebral subluxations of Atlas with a listing of anterior right (AR), C5 body right and global lumbar and dorsal subluxations.

Intervention

The patient was seen for a total of 44 visits over an 8 month period. Care started with three times per week for 30 days followed by two times per week for 30 days and once weekly thereafter. Pettibon and Diversified chiropractic adjustments were utilized in this case. To address his forward head posture head weighting utilizing a 2 lb head weight on his forehead twice weekly for five minutes was implemented.

Following the initial application of chiropractic adjustments to arrest and correct vertebral subluxation, nutritional advice which included eliminating sugar and grains from the patient's diet was also introduced. The mother stated that she has had great success eliminating sugar from the diet but she is still working on eliminating grains.

Outcome

Immediately following the first adjustment the patient began speaking and putting together full sentences that were coherent and understandable. He was also able to recognize his written name for the first time following the first adjustment. He has since started to color with crayons and he can now understand and follow verbal directions. Prior to care he was emotionless but he now smiles and cries appropriately. According to reports by the mother the patient also started to think before he reacts in certain situations and his concentration has improved.

His behavior and demeanor in the office was also noted to be improved. He had difficulty standing or lying still prior to the introduction of chiropractic care and can now remain still and undistracted while getting adjusted or doing spinal rehabilitation exercises.

Two follow-up thermal scans were performed. The first follow-up scan indicated a continued pattern of severe thermal imbalance to the right from C2 down to C5. The second follow-up scan demonstrated a change in the thermal pattern with it shifting to a left imbalance indicating a change in the neurological response to the subluxation pattern. (See Figures 5-6)

Follow-up radiographs revealed an improvement in the cervical curvature from 28 degrees to 41 degrees. In addition, the hip unleveling improved from 5mm down to a 3mm difference and the left lumbar listing improved slightly. (See Figure 7) His postural and palpations findings also improved.

Discussion

Children are oftentimes unaware of the dangers of the world and in this case, the impact learning disabilities have on their lives. The seeking of chiropractic care to deal with learning disabilities and related issues has been increasingly cited in the literature as parents look for a more holistic approach for their children. Areas of interest in the chiropractic literature have been conditions such as autism,⁶ developmental delay syndromes,^{7, 11} ADHD,⁸⁻¹⁴ and Tourette's Syndrome.¹³⁻¹⁴ These studies show that there are various chiropractic interventions or techniques where improvement in learning disorders and disabilities have occurred. These include upper cervical,^{6, 13} SOT,⁸ Pettibon,⁹ Torque Release,¹⁰ and Network Spinal Analysis.¹²

A prospective controlled trial performed by Pauc and Young described birth interventions or distress in children with developmental delay syndromes.⁷ Attention Deficit Disorder, Attention Deficit Hyperactivity Disorder, dyslexia, dyspraxia, OCD, Tourette's syndrome, and Autism all fall under the umbrella of developmental delay syndromes. In this study of 100 children those experiencing any type of fetal distress or birth interventions were twice as likely to have developmental delay syndromes.⁷

Khorshid et al completed a randomized clinical trial comparing upper cervical and full spine adjustments on autistic children.⁶ The study showed that while upper cervical care and full spine care both demonstrated improved health outcomes, upper cervical technique resulted in better clinical outcomes than full spine.

Over the years, chiropractic care has been credited with improvement in behavioral and learning changes in children with learning disorders with the majority of the studies involving ADHD. Lovett and Blum⁸ reported a case of remarkable improvement in a child with ADHD after only three weeks of chiropractic care. In addition to the active care the mother brought in the child's spelling test each week as a marker of progress. This case followed the approach of SOT pelvic blocking and cervical adjustments. They discussed the concept that "sacroiliac function or craniosacral function is involved with driving cerebral spinal fluid around the brain and spinal cord."⁸ This supports the notion that CSF is an important factor for proper function of the central nervous system. Other studies involving chiropractic care to treat ADHD have also shown positive results.⁹⁻¹³

Another case described by Young,¹¹ involved a four year old boy with ADD/ADHD who also had difficulties with spoken language. He spoke only rarely, uttering single words very indistinctly. He was put in speech therapy and made little to no progress. He received 10 chiropractic treatments and "all aspects of his condition had improved."¹¹ In addition to chiropractic adjustments, the patient was prescribed a

proprioceptive exercise regimen as well as dietary modifications and nutritional supplements.

Another case report described a seven year old female whose speech delay was restored after chiropractic care. At this age, she had a vocabulary of only three words. Upon seeking chiropractic care it was discovered that she had received a significant amount of vaccinations in a single visit to the pediatrician when she was sixteen and a half months old. The child's mother informed the chiropractor that the child stopped talking a few weeks after the vaccinations. The chiropractic examination revealed biomechanical abnormalities in the spine, pelvis and cranium, which had previously gone unrecognized by other healthcare specialists. After three weeks of chiropractic care, the child's mother reported improvement in vocabulary.¹⁵

Approaches to Treatment

Accepted therapies in mainstream fall into one of three categories: special education, pharmacotherapy, or psychological.¹⁶ In general, special education takes a remedial, compensatory, or strategic approach based on the child's needs.¹ The pharmacotherapy approach, according to the Merck Manual, administers drugs that minimally affect academic achievement, intelligence, and general learning abilities.^{1, 16} The drugs purportedly help the child focus and learn more effectively. Even though this approach is considered to be experimental it is still widely accepted. The same goes for the psychological approach as well. It is considered to be experimental but it is contended that it can help the child manage his or her disability in addition to social and emotional problems.¹⁶

On the other hand, therapies considered to be controversial, suggest that using supplements, decreasing sugar intake, and avoiding grains in the diet produce favorable results.¹ These therapies are categorized as neurophysiologic retraining or orthomolecular medicine.¹⁶ Neurophysiologic retraining suggests that through "stimulating specific sensory inputs or exercising specific motor patterns one can retrain, re-circuit, or in some way improve the functioning of a part of the central nervous system."¹⁶ Approaches described by Silver in this category would include patterning, optometric visual training, and cerebellar-vestibular dysfunction.¹⁶

Orthomolecular medicine therapy treats mental disorders through optimum concentrations of substances that are normally present in the body. Approaches included in this category that are commonly used are supplementation with megavitamins and trace elements, addressing hypoglycemia, eliminating food additives and preservatives, refined sugars, and addressing allergies. It is suggested that eliminating foods with additives and preservatives from the diet yielded positive results in hyperactivity.¹⁶

In the book, "Healing the New Childhood Epidemics", the authors describe a "healing program" parents could follow to rid their child of autism, ADHD, asthma, and allergies. The program involves four tiers of therapy: nutritional, supplementation, detoxification, and medication.¹⁷ The nutritional component encourages parents to have the child eat "whole, organic, nutrient-dense foods" gluten free and casein

free foods. They should avoid or eliminate allergenic foods and yeast producing foods. Also, carbohydrates should be limited to control blood glucose levels.¹⁷

Supplementation therapy involves taking various nutritional supplements to enhance dietary changes, compensate for any nutritional deficiencies, and support the immune, gastrointestinal and nervous system. Chelation therapy is encouraged in the detoxification stage of the program to help eliminate toxic substances from the body and restore proper function. The final component suggests antifungal, antibiotics, antiviral, and anti-inflammatory medication in cases where necessary.¹⁷

Pettibon Technique

The chiropractic technique utilized in this case was the Pettibon System which was developed in the late 1960's to early 1970's by Burl Pettibon DC. The main purpose of this technique is to "establish a model of the optimum upright spine and procedures for taking, marking, and measuring x-rays so abnormal spinal form can be measured and treatment effectiveness assessed."¹⁸ It is a scientific approach to chiropractic that attempts to restore function to the body. A key principle of this technique is the fact that the functional spinal environment is gravity and that the spine and posture must develop and relate to it.

Pettibon protocol typically involves the use of pre and post x-ray in order to monitor structural spinal changes and act as an outcome assessment. The x-rays are taken seated to increase the stress in the para-vertebral soft tissue and also to avoid leg contraction from the muscles that attach to the spine.¹⁸

Patients undergoing this technique may be encouraged to do prescribed exercises at home and in the office on the day of a visit based on their needs. There are three phases to care in Pettibon: 1. Acute 2. Rehabilitation and correction, and 3. Maintenance and supportive care.¹⁸ The acute phase works to relieve pain, restore cervical curve, and balance the spine anterior to posterior. The rehabilitation and correction phase is designed so the patient receives permanent correction of abnormal spinal deviations. The last phase, maintenance and supportive care, is focused on maintaining and enhancing the spinal and postural corrections made over the course of treatment.

Mechanism of Action

Children with learning disabilities also face the presence of co-morbidities. The literature indicates that children with learning disabilities present with some aspect of the named conditions previously mentioned along with other neurodevelopmental disorders. Chiropractic management of patients with learning disabilities has produced positive results in the cases discussed. Chiropractic care might be successful, as in this case, because its focus is the correction or reduction of vertebral subluxations which may improve the quality of life for a child.

One proposed mechanism as to why chiropractic has an effect on children with learning disorders is attributed to CSF circulation. When the body's ability to circulate the fluid

throughout the body has been compromised, these children begin to express the signs and symptoms most commonly seen with learning disorders.⁸

Most developmental speech disorders usually have a neurological component. These disorders usually represent disorders of the left hemisphere of the brain.¹⁵ This may be why addressing problems of the cranial vault is beneficial in those children with speech delay problems. Having altered brain structure can lead to a delay in temporal processing. These children sometimes have an impaired ability to perceive and produce speech sounds.⁴

In their paper reporting on positive outcomes in a child with ADHD undergoing subluxation based chiropractic care Stone-McCoy and Przybysz¹⁹ discuss evolutionary theories proposed by Melillo and Leisman²⁰ that suggest bipedalism is responsible for the development and evolution of the human neocortex and that abnormalities in postural development or activity may disrupt cerebellar and cortical maturation. Melillo and Leisman assert that motor incoordination and disruptions in executive functions are a common thread in most developmental disorders which stem from the inability to bind motor and cognitive functions due to understimulation of the cerebellum and thalamus. They further suggest that there may be a dysfunction of hemisphericity with a failure to achieve equal activity between the left and right hemispheres.

Stone-McCoy and Przybysz also suggest the role of the Brain Reward Cascade as a mechanism in neurodevelopmental disorders which are considered part of the spectrum of reward deficiency syndromes tied to dysfunction of the D2 dopamine receptor.²¹ Individuals with a defect in this gene are unable to produce a reward cascade and are unable to experience well-being. In addition to things such as genetic factors, illness, nutritional deficiencies, drug and medication interactions - loss of normal neurological function secondary to vertebral subluxations may lead to a Reward Deficiency Syndrome.²¹

Conclusion

This paper describes the case of a four year old male with past history of a learning disorder and speech delay. Dramatic improvement in neurodevelopment is noted following the introduction of chiropractic care concomitant with a reduction in vertebral subluxation. Since it is impossible to generalize the results of a single case study to the population of children with learning disorders and speech delay, additional research on neurodevelopmental disorders and its relationship to chiropractic is warranted. This report raises important issues regarding the role of chiropractic within the multidisciplinary management of patients with neurodevelopmental disorders.

References

1. The Merck Manual of Diagnosis and Therapy, 18th Edition 2006.
2. Medline Plus. National Institute of Neurological Disorders and Stroke. Learning Disorders. <http://www.nlm.nih.gov/medlineplus/learningdisorders.html>. [online]. [cited 2009, July].

3. Learning Disabilities in Children Learning Disability Symptoms, Types, and Testing. http://www.helpguide.org/mental/learning_disabilities.htm [online][cited 2009, July].
4. Whitmore K, Hart H, Willems G. Chapter 2: The Neurological Basis of Learning Disorders in Children, Chapter 9: Insights From Infants: Temporal Processing Abilities and Genetics Contribute to Language Impairment. A Neurodevelopmental Approach to Specific Learning Disorders. 1999. 24-73, 191-210.
5. American Speech-Language-Hearing Association. Language-Based Learning Disabilities. <http://www.asha.org/public/speech/disorders/LBLD.htm> [online] [cited 2009, July].
6. Khorshid KA, Sweat RW, Zemba DA, Zemba BN. Clinical efficacy of upper cervical versus full spine chiropractic care on children with autism: a randomized clinical trial. *J Vert Sublux Res.* March 2006. 1-7. Online
7. Pauc R, Young A. Foetal distress and birth interventions in children with developmental delay syndromes: a prospective controlled trial. *Clin Chiropr.* 2006. 9:182-185.
8. Lovett L, Blum C. Behavioral and learning changes secondary to chiropractic care to reduce subluxations in a child with attention deficit hyperactivity disorder: a case study. *J Vert Sublux Res.* October 2006. 1-6. Online
9. Cassista G. Improvement in a child with attention deficit hyperactivity disorder, kyphotic cervical curve and vertebral subluxation undergoing chiropractic care. *J Vert Sublux Res.* April 2009. 1-5. Online
10. Bedell L. Successful care of a young female with add/adhd & vertebral subluxation: a case study. *J Vert Sublux Res.* June 2008. 1-7. Online
11. Young A. Chiropractic Management of a child with add/adhd. *J Vert Sublux Res.* September 2007. 1-4. Online
12. Pauli Y. Improvement in attention in patients undergoing network spinal analysis: a case using objective measures of attention. *J Vert Sublux Res.* August 2007. 1-9. Online
13. Elster E. Upper cervical chiropractic care for a nine-year old male with tourette syndrome, attention deficit hyperactivity disorder, depression, asthma, insomnia, and headaches: a case report. *J Vert Sublux Res.* July 2003. 1-11. Online
14. Pauc R. Comorbidity of dyslexia, dyspraxia, attention deficit disorder, attention deficit hyperactive disorder, obsessive compulsive disorder and tourette's syndromes in children: a prospective epidemiological study. *Clin Chiropr.* 2005. 8:189-198.
15. Fysh P. Speech delay restored after chiropractic care: Acquired verbal aphasia in a 7 year old female. *International Review of Chiropractic.* October 1998. 49-53.
16. Silver L. Controversial approaches to treating learning disabilities and attention deficit disorder. *Am J Dis Child* 1986; 140(10): 1045-1052.
17. Bock K, Stauth C. Chapter 2: The Healing Program. *Healing the New Childhood Epidemics.* 2007. 14-25.
18. The Pettibon Institute Research and Education. <http://www.pettibonsystem.com>. [online][cited 2009, July].
19. Stone-McCoy PA, Pryzbysz L. Chiropractic management of a child with attention deficit hyperactivity disorder and vertebral subluxation: a case study. *J Pediatric, Maternal & Family Health.* March 2009. 1-8. Online
20. Melillo R, Leisman G. Introduction in *Neurobehavioral Disorders of Childhood. An Evolutionary Perspective.* 2004 Kluwer Academic/Plenum Publishers. New York.
21. Blum K, Braverman E, Holder J, Lubar J, Monastra V, Miller D, et al. Reward Deficiency Syndrome (RDS): A biogenetic Model for the Diagnosis and Treatment of Impulsive, Addictive and Compulsive Behaviors. Vol 32 Supplement. November 2000. Haight Asbury Publications. *Journal of Psychoactive Drugs.*

Figure 1- Initial Thermal Scan

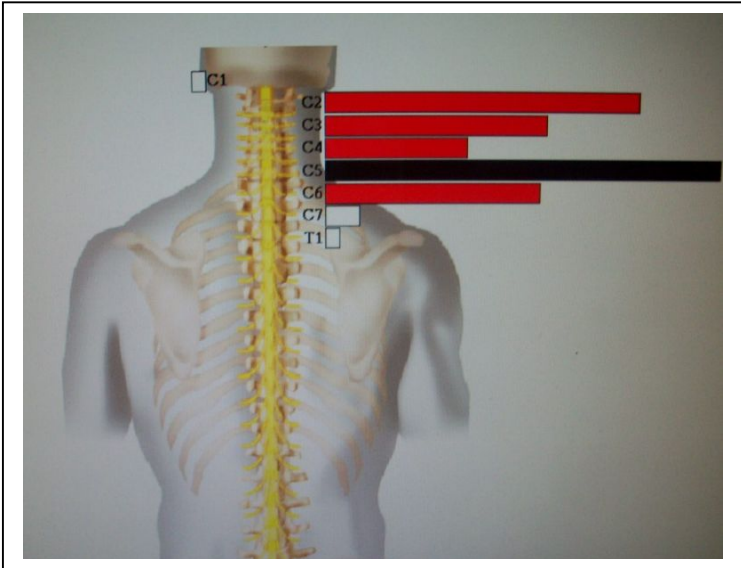


Figure 3 - Initial Lateral Cervical



Figure 2 - Initial A-P Thoraco-Dorsal X-ray

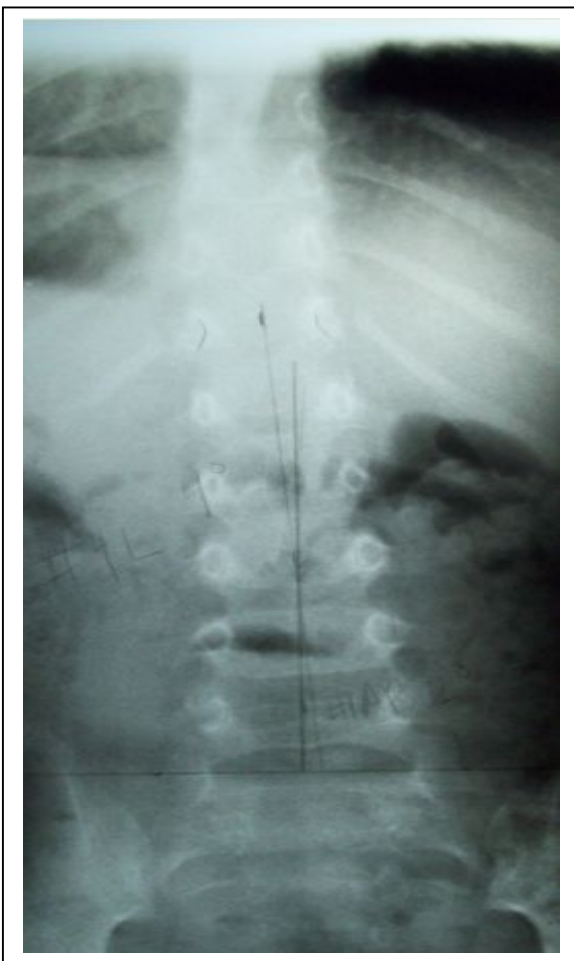


Figure 4 - A-P Cervico-Dorsal - Pre



Figure 5 - Follow-up Thermal Scan 2 ½ Months Later

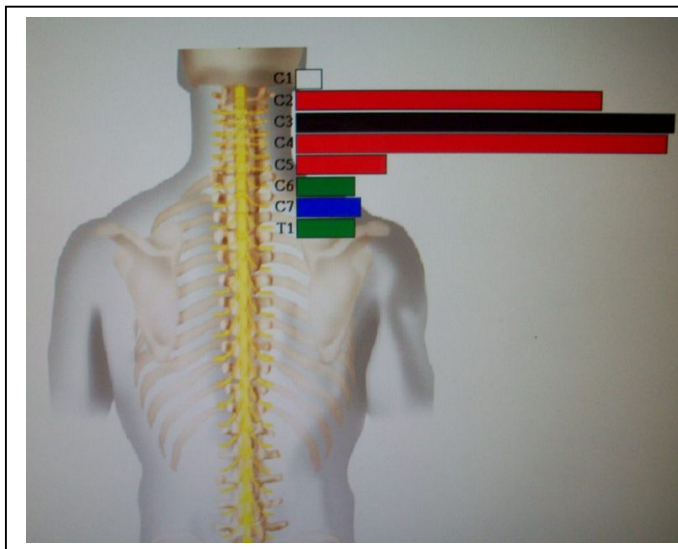


Figure 7 - Lateral Cervical Post – 8 Months Later

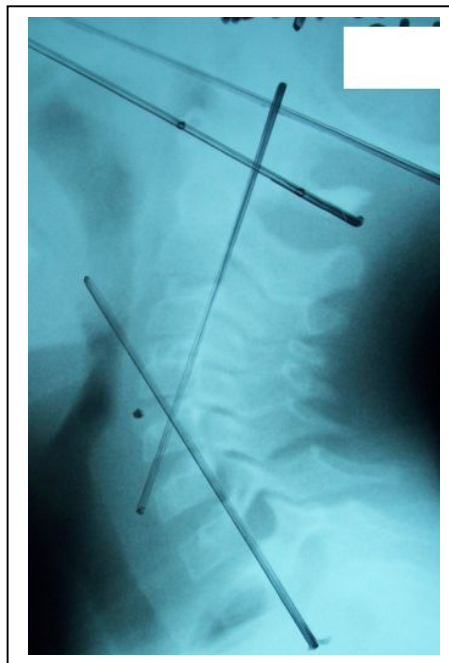


Figure 6 - Third Thermal Scan 2 months After Second

