

Improved posture and physical resilience through chiropractic care in 3-year-old female: A case report

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Abstract: *Objective/Clinical Features* A 3-year-old female presented for chiropractic care for poor posture, poor motor control and low energy levels. Examination revealed retained primitive reflexes and vertebral subluxations.

Intervention/Outcomes Three consecutive courses of care commenced, during which chiropractic care for vertebral subluxation was concomitant with steady improvements in posture and physical resilience as well as integration of retained primitive reflexes and an improvement in gross motor skills.

Conclusion Chiropractic care for the reduction of vertebral subluxations may result in changes at the brainstem level and lead to better integration of primitive reflexes and an increase in posture, gross motor skill and generalised physical resilience. Further research is required to isolate and confirm the mechanisms behind such improvements.

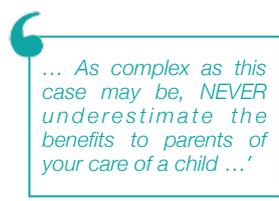
Indexing Terms: Chiropractic; Subluxation; digestion; posture; resilience; adaptability.

Introduction

Retained primitive reflexes are thought to result either from birth trauma or nonspecific issues occurring during the first few months of life. More broadly speaking, they may be indicative of brain imbalances, especially if a reflex is more obviously retained on one side. It is said that a child's 'psychomotor progress can only occur if the central nervous system has reached maturity.' (1) Failure to reach such maturity may create issues further on in life, such as gross motor problems and ongoing brain imbalances. Some research has indicated ADHD or other sensory processing issues may link back to retained primitive reflexes in childhood. (2)

While further research is required to isolate the mechanisms or indeed confirm the link between retained primitive reflexes and such disorders, the question of whether or not chiropractic care in early childhood can support brain maturity, nervous system function, and gross motor development remains. Specifically, can subluxation-based care address retained primitive reflexes and improve a child's nervous system adaptability in a measurable way?

The *Australian Spinal Research Foundation* defines the Vertebral Subluxation as 'A diminished state of being, comprising a state of reduced coherence, altered biomechanical function, altered



... As complex as this case may be, NEVER underestimate the benefits to parents of your care of a child ...'



neurological function and altered adaptability.' (3) This case report examines whether vertebral subluxation-based care of a 3-year-old girl yielded positive results for retained primitive reflexes and gross motor skills.

Background and History

A 3-year-old female presented for chiropractic care, with parents citing main concerns of poor posture, poor motor control, and low energy levels. She was brought to the clinic as her older brother had received some benefit from chiropractic care and thus the parents were hopeful that care would yield some improvement. in this child.

Prior to the current case report period, the patient had undertaken four prior treatment plans including the current one. The first three plans totalled 34 visits (as 10, 12, and 12). In the current care plan period, there was a demonstration in the patient of general low physical resilience. This extended to immune function, as the patient had suffered from pneumonia early on, and was exhibiting a delay in some aspects of her development. Crawling was delayed and was uncoordinated when achieved. She began walking at 13 months old and often walked on her toes.

Other issues included concerns around proprioception and motor learning difficulties, with the patient having difficulty learning to ride a bike and to skip, and some reports of back pain. There was a further history of sleeping issues, fatigue, temper tantrums, being easily frustrated, and not coping well with stress. She struggled to sit still, tended to slump, and needed to sleep with the lights on. Otherwise, she was generally healthy.

Notably, she was born via emergency C-section at 37 weeks following a failed induction. Infant distress was the cause for the C-section. Initially, she had issues waking to feed. A potentially significant observation made by the attending chiropractor was that the patient had generalised poor muscle tone and cortical density in addition to the retained primitive reflexes.

Examination

A chiropractor's examination included a subluxation pattern at the occiput, C2, C7, T4, L2 and S2, and associated range of motion restrictions. She also exhibited cranial restrictions, peripheral issues on the left, and *genu valgum* on both legs. She had also evidence of poor cortical inhibition of her primitive reflexes, with a number of primitive reflexes still able to be elicited. She exhibited poor postural development. Her gross motor patterns were poorly organised. Additionally, balance was extremely difficult and some cerebellar and body awareness issues appeared to be present.

Initial Examination

Joint & Bone: Cranial restrictions were noted on left temporal, and right frontal, and maxilla. There was moderate restriction with flexion, and mild restriction with right rotation and lateral flexion on both sides of the neck. Moderate extension restriction was detected in the mid-thoracic region and mild left lateral flexion restriction. Pelvic restrictions were shown in left with poor SI flexion and right poor right SI extension. Most of the peripheral system was moving well. However, the left hip sat more posterior in the joint and restriction was noted at the left knee tib/fib joint.

Nerve & Muscle: Areas of subluxation included C0, C2, C7, T4, L2 and S2. Weakness was noted in the muscles of the right shoulder and both wrist extensions, as well as finger adduction and opposition. Weakness noted with glutes, hamstrings, hip flexors and right knee (in extension). There was also some weakness noted with right foot dorsiflexion. Cranial nerves showed imbalance/under activity with smell, right facial tone, and right tongue muscles. Neurological reflexes showed reduced activity of the pectoral muscles, biceps, brachioradialis and triceps.

Abdominal and patellar reflexes on the right were within normal limits, however both Achilles reflexes were under-active.

Global Posture: Posture images showed a left head tilt, strong right shoulder tilt, and left hip tilt. There is also a notable left body lean. Lateral images showed poor postural strength with a forward position of the pelvis, rounded shoulders, and forward head position. It was noted that the patient noticeably hyperextended into her lumbar spine.

Brain Function: Developmentally, it was evident that there was some immaturity and poor neurological (higher cortex) tone with how her brain was firing. All of the tested primitive reflexes were still present - *moro*, *rooting*, *palmar*, *TLR*, *ANTR*, and *Galant*. Postural reflexes and tone were tested. There was a present *STNR* (flexion and extension) present well past the usual integration. Additionally, there was a decreased left amphibian reflex, decreased right neck righting with eyes closed. Poor flexion and extension postural tone was noted with poor initial strength and fatigability seen. Gross motor skills showed low tone in the quads and glutes - heel walk, toe walk, and hopping were difficult. There was reduced cross cord ability and her reciprocal arm swing hadn't developed. Balance tests were within normal limits, but there was a noticeable left body lean (standing, with eyes closed). Finger to nose was difficult on the left side, while diadochokinesis was harder on the right. Poor point localisation was noted on both sides.

Management

Following these initial findings, the patient underwent four courses of care.

- ▶ First - 10 adjustments at 2 sessions per week
- ▶ Second - 12 adjustments at 2 sessions per week
- ▶ Third - 12 adjustments at 1 session per week
- ▶ The current care plan - adjustments every two weeks for an estimated 24 weeks

First Care Plan

The established care plan goals included supporting brain and body coordination and function, restoring spinal range of motion as well as cranial function and muscle activation. Additional goals included improvements in cortical firing, a reduction in primitive reflexes as a sign of improved cortex inhibition of the brain stem, improvement in body tone to improve neurological reflexes and postural tone, with the aim of supporting better coordination and body control.

This was to be achieved through subluxation-based care with additional postural strength and motor development exercises for at home once daily.

Second Care Plan

Care plan goals for the second plan were to continue to build on the progress made during the first, including further improvements with structural symmetry, improved neurological tone, strength, and coordination. The patient had started to show improvements in structural, muscular, and neurological health and development.

Recommendations included postural strength, motor development, balance and body awareness exercises undertaken at home twice daily. Additionally, to support gut and brain, fish oils, gut care for kids, magnesium, and multi-vitamin were highlighted as potentially beneficial supplement options.

Third Care Plan

Care plan goals concentrated on seeing further shifts with neurological reflexes and tone in upper and lower body, as well as decreased evidence of right brain weakness and improved cross crawl ability. Another goal of care was to see further integration of primitive reflexes and a sign of

improved motor organisation, a decreased need for overflow movements to support concentration.

Home recommendations included crossing midline exercises to be undertaken twice daily, along with magnesium supplementation to support rest and repair. The chiropractor noted a specific focus on *vagal nerve* tone including strategies like 30 seconds of gargling every time she brushed her teeth, plenty of singing every day, and humming when in the car. Her parents were advised to keep up the posture exercises already provided and to encourage her in a sport like karate or Taekwondo to further support strong motor developmental improvements seen under care.

During adjustments, the chiropractor focused on the left side of the body. To support this, parents were advised to massage and stimulate the left limbs at home, pulling, squeezing, and using a light touch. It was also advised that they take her to the beach for plenty of soft sand walking with her shoes off or let her undertake climbing activities to encourage foot development.

Outcomes

Significant improvements over the course of care included improvements in posture and notable improvements in the '*Well Kids report*' assessment and care plan which yielded an initial health number of 22 at the commencement of the first care plan, and 40 at the fourth. Feedback from her parents described improved physical resilience, greater ability to keep up, she was more active on the weekends, and able/wanting to have more fun and physically active with the rest of the family. The parents reported they really enjoyed having '*a different daughter*'. The attending chiropractor noted that what they thought was personality was actually '*neurological tone and poor physical resilience*' that improved under care. Other improvements included a reduction in colds and flus.

The patient commenced with a health number 22. Anterior postural assessment revealed the following:

- ▶ head was shifted 0.63cm left with no tilt
- ▶ Shoulders were shifted 0.88cm right and tilted 4.07 deg right
- ▶ Rib cage shifted 1.32cm left
- ▶ Hips are shifted 1.17cm left and are tilted 4.14 deg left
- ▶ Total shifts 4cm
- ▶ Total tilts 8.2 deg

Lateral posture assessment revealed:

- ▶ Head shifted 0.55cm forward
- ▶ Shoulders are shifted 4.42cm backward
- ▶ Hips are shifted 1.05cm forward
- ▶ Knees are shifted 1.23cm forward
- ▶ Total shifts 7.25cm
- ▶ The head weighs approximately 2kg but effectively weighs 3kg

Outcomes at Care Plan 2

Her health number was now 40, which reflected an improvement of 81.82% on the commencement of care.

Joint & Bone: There was a marked improvement in cranial bone function, evident in improved left temporal and sphenoid restrictions. Range of motion of the spine had started to improve, with

less restriction noted in the neck. Flexion restriction (mild) was now seen. Extension restriction of the mid back was now milder than at the initial consultation. Her lower back now moved well, and the pelvis restrictions had also improved, with the left side restriction remaining. Peripheral joints showed improved left hip and knee movement with the right shoulder now showing the need for support.

Nerve & Muscle: Areas of subluxation showed right AS, C7, T3, L2, LSI. Cranial nerves showed improvement with the tongue positioning. However, facial tone and sense of smell showed difficulty. Muscle tone showed good improvement of shoulder strength. Weakness in strength was still noted with wrist extension and in the fingers. Muscle strength of the lower limbs continued to show decreased glute, hamstring, hip flexors and right quad weakness. Neurological reflexes showed improvement with bicep and brachioradialis responses. Under activity still noted with the scaphoid, pec, triceps, patella and Achilles.

Global Posture: Postural images showed a huge improvement in body organisation and balance. Although there were still many improvements to be made, there was already an apparent improvement in head position with less head tilt. Left rotation was present. The shoulder alignment had improved well. There continued to be a right shoulder tilt with a compensatory left head translation. The pelvis seemed to tilt to the right with this review. However, weight distribution was much better, with 10.6kg on the left and 9.7kg on the right. This was significant as the previous imbalance was 3kg. Side images showed a strong forward position, whereas initial images showed lower tone and poor positioning with the patient 'falling into' her spine. The forward lean highlighted her decreased proprioception and lack of body awareness in space with eyes closed.

Brain Function: Significant improvements in brain function were evidenced by inhibition of primitive reflexes which indicated better maturity. The Rooting reflex was now mild, as was the palmar reflex. The moro was now integrated. Postural reflexes also showed excellent improvement with flexion strength up to 20s and extension strength on the ball 8s. Gross motor assessment showed much improved co-ordination with her jumping. Difficulty still seen with toe and heel walking. Balance and body awareness had improved, as had cerebellar function and discrimination touch.

Outcomes at Care Plan 3

The patient now had a health number of 59, which reflected an improvement of 47.5% on the previous review.

Joint & Bone: Cranial restrictions were noted around the left frontal and temporal bones. Spinal range of motion had improved well over time. Mild restrictions were noted in the neck, right lateral flexion, thoracic extension and left SI extension restriction. All peripheral joints were now moving better. Knocked knee posture was still present but less severe due to improved tone of the feet and legs, and improved arch strength in the feet.

Nerve & Muscle: Areas of subluxation were now just C2, T4, L SI, less areas than previously. Cranial nerves were now showing good balance and upper limb muscles showing excellent strength improvement with weakness now only seen in wrist extension on both sides and on right thumb abduction. Lower limb muscles were firing well. Reflexes overall still showed decreased responses in the upper and lower body. However, the chiropractor noted that this may still take time to improve as it requires much deeper neurological change. However, the shoulder responses had returned with good scapula/hum and pectoral responses noted.

Global Posture: Posture images showed excellent improvement in overall strength and ability to stand up tall against gravity. Right head tilt and right shoulder tilts were still present, which comprised a strong indicator on the right brain weakness. Right pelvic tilt had improved, tone of

the right leg and its internal rotation is again a sign of the right brain weakness. Side images show significant progression in posture tone and improvement. Alignment was now excellent, but shoulders posture still required improvement as they roll forward but overall, excellent changes were present in this care plan! Her centre of gravity was also much better. There was only a 100g difference with right and left leg weight distribution, which was an improvement on the initial difference of 3kg.

Brain Function: Primitive reflexes had yielded further improvements. Her *ATNR* was now only moderate, and *Galant* was just mildly present. Posture strength exercises have improved very well. She was able to achieve a greater chin tuck (from 13s to 30s) showing improvement in deep neck flexor strength and stability. Supine flexion had moved from 6s to 30s, and prone extension from 6s to 30s. Gross motor activities show cross crawl pattern is still not fluid and needs further work to support better right and left-brain communication. Hopping is difficult on the left. Toe walking still produces arm/wrist reciprocal movements indicating some immaturity. However, balance had excellent improvement. She was much more organised in her movement, and could now stand on one leg up to 9s on the left and 8s on the right. She didn't lean or fall as she did at the start when doing her balancing tests. Cerebellar activities are also improving, although the right was still harder than the left with finger to nose. Diadokokensis was excellent and sequential finger touch now much improved.

Ongoing care

At the time of writing, she was into her fourth course of care, where she would be adjusted every two weeks for 24 weeks. There was now a big emphasis on moving the body, with at-home exercises geared at improving proprioception, balance, body awareness, and the vestibular system now a key. The attending chiropractor noted that she *'continues to improve while under care. Her neurological maturity, body resilience and general maturity has come along really well. During this review, she was tired after some late nights. Her mother had noted really great changes with her body and brain growth in conjunction with her adjustments. She is now much improved in sleep, moods, behaviours, concentration, and general resilience.'*

Immediate goals of ongoing care are now to support, maintain and build on great changes, with cortex stimulation being *'absolutely key, with a right brain focus'*.

Discussion

This case proves to be as interesting as it is complex. Retained primitive reflexes, global posture, lowered resilience and issues with mood, behaviours, sleep and concentration comprise widespread functional and neurological challenges. Being able to see these improve concomitant with chiropractic care may indicate that care for vertebral subluxations may improve cerebellar function, and nervous system function and cortex maturity more broadly. The primitive reflexes are a by-product of an immature cortex, as supported by research. They themselves are less of the issue – they are the result of poor brainstem inhibition from the cortex).

While this case report alone is not able to specify the mechanisms behind such improvements or allow generalisations on the wider population to be made, it is logical to posit that optimal functioning of the nervous system may have led to increased adaptability, nervous system tone, and resilience which then manifested in improvements in function.

The courses of care in this case may be thought of as long, however, with the complex nature of concerns, such as those the patient presented with, the repetition and time needed for deeper neurological rewiring would not have been achieved with a shorter course of care and was not the ideal clinical choice. Rather, working with the patient and her family to create sustainable change at a manageable rate was the preferred course of action.

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Cite: Pryjma S, Postlethwaite R, McIvor C. Improved posture and physical resilience through chiropractic care in 3-year-old female: A case report. *Asia-Pac Chiropr J.* 2022;2.6. URL apcj.net/papers-issue-2-6/#PryjmaResilience

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About the Chiropractor

Dr Jacey Pryjma obtained her Bachelor of Chiropractic Science in 2005, and later her Master of Chiropractic in 2007, from Macquarie University. Jacey founded Well Kids in 2013, developing the Well Kids Program, and is now the Director of the [Australian Children's Chiropractic Centre](#) in New South Wales, Australia

About the Case Report project

This Case Report is a part of the [ASRF Case Report Project 2021](#), a project designed to gather client studies from chiropractors and transform them into much-needed case reports, focused on the effects of chiropractic care on clinical presentations highly relevant to chiropractic, such as stress, immunity and adaptability. This project was made possible by the generous fundraising and contributions of ASRF supporters.

