

Chiropractic management of a 49-year-old female with Arnold-Chiari Malformation and associated neurological sequelae: A case report

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Background: A 49-year-old female with a diagnoses of Arnold-Chiari Malformation (ACM) and prior decompression surgery presented to a Chiropractic practice with primary concerns of neck and shoulder pain, dizziness, chronic migraines, facial palsy, and functional limitations affecting activities of daily life.

Intervention: The patient received subluxation-based chiropractic care utilising the Knee Chest Upper Cervical (KCUC) technique over a care plan of thirty-six appointments across four to six months. Reexaminations were conducted at every twelve appointments.

Outcomes: Progressive improvements were observed across all objective measures, including paraspinal thermography, cervical range of motion, leg length symmetry, and cervical distraction findings. The patient reported subjective improvements in stress, pain, numbness, memory, anxiety, breathing, dizziness, and balance. Migraine frequency and intensity, neck pain, and dizziness showed clinically meaningful reduction. Sleep quality improved, and the patient reported greater capacity for activities of daily living, including household tasks.

Conclusion: The findings contribute to a limited body of chiropractic literature on this condition and support calls for larger-scale prospective research. Further research on this topic may greatly benefit the profession, and patients who suffer from Arnold-Chiari Malformation.

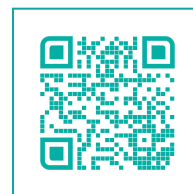
Indexing Terms: Chiropractic; Subluxation; Arnold-Chiari Malformation; Knee Chest; Quality of Life.

Introduction

Arnold-Chiari Malformation (ACM), also referred to simply as Chiari Malformation (CM), describes a group of structural defects of the cerebellum and its relationship to the skull base and spinal canal. (1) The condition was originally described by Hans Chiari in 1891 and subsequently classified into four subtypes (Types I - IV) based on the extent and nature of the herniation and associated anomalies. Type 1, the most likely form

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encountered in a Chiropractic practice, is characterised by caudal descent of the cerebellar tonsils by more than 5 millimetres below the foramen magnum, causing compression of the brainstem and upper cervical spinal cord. (2)



Type 2, often associated with myelomeningocele, wherein parts of the brain and spinal cord are pushed down into the spinal canal, involves more extensive posterior fossa structures and typically presents perinatally. Types 3 and 4 are considerably more rare and carry a more severe prognosis. This report concerns ACM-1, the variant most likely to be encountered in adult Chiropractic practice.

The true prevalence of ACM-1 has historically been difficult to establish due to the variable clinical presentation and the high proportion of asymptomatic individuals. Contemporary estimates suggest that 1/1000 people are symptomatic and approximately 1/100 meet the radiological criteria. (3) ACM-1 exhibits a higher prevalence in adult females than males, a pattern consistent with several autoimmune and connective tissue conditions that may co-exist or predispose individuals to posterior fossa crowding. (4)

A significant proportion of patients with ACM-1 remain asymptomatic for years or decades, with symptoms often emerging in the third to fifth decade of life following a precipitating event such as trauma, physical strain, or progressive spinal instability. This delayed presentation underscores the importance of thorough case history and imaging in chiropractic practice when evaluating patients with suboccipital pain, unexplained dizziness, or progressive neurological symptoms.

The primary anatomical abnormality is a congenitally small or underdeveloped posterior cranial fossa, which fails to accommodate the normal volume of posterior fossa contents, resulting in herniation of the cerebellar tonsils through the foramen magnum. (5) This herniation disrupts the normal flow of cerebrospinal fluid (CSF) between the cranial and spinal compartments, creating a craniospinal pressure gradient that may further propagate or exacerbate the herniation. Brainstem and upper cervical cord compression resulting from tonsillar herniation produces a wide and often non-specific constellation of symptoms that complicates timely diagnosis.

ACM-1 often presents with variable symptomatology. The most commonly reported symptom is headache, particularly suboccipital or 'Valsalva-type' headache precipitated by coughing, straining, or physical exertion, reported in the majority (upwards of 80%) of symptomatic patients. (2) Other frequently observed presentations include severe pain, sensory disturbances such as paraesthesia and dysaesthesia, nausea and vomiting, limb weakness, and cranial nerve deficits. Vertigo, balance disturbance, dysphagia, sleep-disordered breathing, and visual disturbances are also reported. (1, 2)

It is important to note that, in this case, cranial nerve involvement presenting as facial palsy is not a primary ACM-1 symptom. However, it can occur secondary to brainstem compression, elevated intracranial pressure, or cerebellar compression. Facial nerve (cranial nerve VII) palsy, whether presenting as focal facial weakness or more complete hemifacial drooping, may occur in isolation or in combination with abducens (VI) and other lower cranial nerve palsies. (6, 7)

Published case reports document bilateral abducens palsies and facial weakness as presenting manifestations of ACM-1, seven and more complex cranial nerve syndromes, including the rare 'Eight Syndrome' (conjugate gaze palsy with ipsilateral facial nerve palsy), have been described in the context of ACM-associated syringomyelia. (7) These observations are clinically relevant when examining a patient such as the one presented in this report, in whom pre-existing facial palsy formed part of the complex neurological picture.

For symptomatic patients seeking relief, surgery remains the most obvious option. However, this is complicated by the risks of surgery and reports of variable results. The existence of a subset of patients who undergo surgery yet retain residual neurological and musculoskeletal symptoms creates a patient population for whom complementary conservative management may be of interest. However, the paucity of literature on the topic likely makes this option almost invisible to them. The available evidence consists primarily of case reports, and no controlled trials or prospective cohort studies examining chiropractic management of ACM-1 have been identified at the time of writing.

A notable Chiropractic case report was published in the Journal of Chiropractic Medicine in 2014, describing chiropractic care for a 34-year-old woman previously diagnosed with ACM-1 presenting with headaches and dizziness. The patient responded positively to a course of low-velocity, low-amplitude upper cervical mobilisation followed by high-velocity, low-amplitude adjustments. (8) The authors appropriately cautioned that spontaneous resolution of some ACM symptoms is possible, and therefore a direct causal relationship between chiropractic care and structural or clinical improvement could not be definitively established.

A second case report published in the American Journal of Case Reports described a 62-year-old woman with residual syringomyelia following foramen magnum decompression who presented to a chiropractor with progressive neck pain and headaches. Multimodal chiropractic and rehabilitative therapies resulted in clinical improvement, though the authors noted that given the limited evidence base, these interventions could not be broadly recommended but warranted consideration on a case-by-case basis. (9)

A further 6 case reports have been published in these pages, and this present report is offered as a contribution to this limited literature, with the hope of stimulating larger-scale inquiry into Chiropractic care for this population.

Case details

A 49-year-old female presented for Chiropractic care with a chief complaint of chronic migraines and facial palsy. She was novice to Chiropractic, and reported a low level of physical activity. At the time of presentation, she described herself as a housewife and disclosed a diagnosis of Arnold-Chiari Malformation.

History and examination included a discussion of the patient's goals. She was diagnosed with Arnold-Chiari Malformation Type 1 and had undergone posterior fossa decompression surgery fifteen years prior to presentation. She reported mild to moderate improvement in symptoms

following surgery, with a reduction in the severity of headaches and sensory symptoms in the immediate post-operative period. However, a number of symptoms persisted or re-emerged in the years following surgery.

The patient reported having experienced chronic migraines for approximately twenty years. These were described as severe, episodic headaches exacerbated by bright lights and the ingestion of dietary triggers, particularly chocolate. Associated symptoms included visual disturbances and nausea. The patient managed migraines with injectable treatment and over-the-counter analgesics. She reported that migraine frequency and severity had worsened in the 12 months before her presentation at the clinic.

Facial drooping was also a concern, with the patient describing intermittent unilateral facial shifts. The precise aetiology and onset of the facial palsy in the context of ACM were not further specified in the patient history; however, the association between cranial nerve VII dysfunction and ACM is documented in the literature, and this was considered a potentially related neurological sequela of her underlying condition.

Neck and shoulder pain had progressively worsened over the year preceding presentation. During this time, the patient had sought assessment from her general practitioner and a neurosurgeon, but had not initiated any new intervention. Positional dizziness upon transitioning from sitting to standing was reported. She also noted difficulty taking deep breaths, with a background history of rhinitis contributing to upper respiratory limitations that may co-occur with ACM-1. The patient also reported poor sleep.

Aims of care, for the patient, included a desire to become more physically active, to improve her energy levels, reduce fatigue, and manage her pain more effectively. She identified difficulty completing household chores and disrupted sleep as her most functionally limiting secondary complaints, and wished to regain her functional capacity here. She also described sensitivity to bright lights as an ongoing quality-of-life concern.

Clinical findings

Postural assessment revealed an antalgic posture with observable compensatory patterns. A functionally short leg was identified on static assessment, where it was noted that the patient had a right short leg (approximately 1cm) which was corrected by rotating the head right. Cervical range of motion was restricted. Cervical radiographs were also taken, confirming the diagnoses of ACM, and also revealing straightening of the cervical spine, severe narrowing of disc spaces C5/6 and C6/7, background cervical spondylosis and mild osteophytosis of vertebral bodies.

Use of the Balance Scales indicated asymmetrical weight distribution.

Radiographic analysis in conjunction with thermographic findings identified the site and nature of subluxation for the purpose of directing the Knee-chest upper cervical adjustment technique. Integrating findings from thermography, leg length analysis, postural assessment, and radiographic evaluation, subluxations were identified at the craniocervical junction, with primary

involvement of the atlas (C1) and axis (C2). Secondary findings consistent with subluxation were noted at C5-6 and C6-7.

Management

The primary Chiropractic technique employed was Knee Chest Upper Cervical (KCUC), a subluxation-based approach focused on analysis and correction of craniocervical subluxations at the atlas and axis. The technique involves positioning the patient in a knee-chest posture on a specialised adjusting table, allowing gravity-assisted cervical traction and facilitating a precise, low-force toggle-recoil adjustment to the upper cervical spine.

A care plan of 36 appointments over four to six months was recommended. Formal reexaminations were scheduled at every 12 appointments, or sooner if new or worsening symptoms were reported. The reexamination protocol included reassessment of all baseline objective measures (thermography, cervical range of motion, leg length, cervical distraction, and Bournemouth questionnaire), as well as a structured review of subjective symptom changes as reported by the patient.

In addition to segment-specific Chiropractic care, the patient was provided with general information and guidance regarding lifestyle factors known to support musculoskeletal and neurological health. These included education on sleep hygiene, dietary considerations, and the importance of graduated physical activity appropriate to her current functional capacity.

Outcomes

As laid out in the original care plan, reviews were undertaken every twelve weeks. However, early on in the care plan, the patient began reporting improved stress levels, memory, breathing and balance alongside reduced pain, numbness, anxiety and dizziness. This co-occurred alongside improved findings across all objective measures.

Paraspinal thermography demonstrated a reduction in bilateral asymmetry at the upper cervical region, indicating improved neurological balance. Cervical range of motion improved across multiple planes: flexion, extension, left lateral flexion, right lateral flexion, left rotation, and right rotation. Functional leg length inequality reduced. Postural analysis demonstrated improved spinal alignment.

The patient reported meaningful subjective improvement across all primary complaints. Migraine frequency and intensity were reduced to less than one visit per month, with the patient requiring less reliance on injectable and analgesic management. Neck and shoulder pain improved significantly. Episodes of dizziness upon sitting to standing became less frequent and less severe. The patient noted improvement in breathing comfort, which she attributed in part to reduced upper cervical tension.

Broader health improvements were reported at reexamination, including reduced perceived stress, improved memory and cognitive clarity, reduced anxiety, and improved sleep quality. The patient reported improved capacity for household tasks and greater functional independence. Balance was subjectively improved. The BQN score at final reexamination was now down to seven, where the original score was 43, representing significant improvement from the baseline.

The patient expressed satisfaction with the outcomes of care and noted a meaningful improvement in her overall quality of life. She reported feeling more 'in control' and independently began re-engaging in limited household activities.

Discussion

The breadth of self-reported improvements, encompassing stress, pain, numbness, memory, anxiety, breathing, dizziness, and balance, reflects the systemic influence of craniocervical subluxation on neurological function and the potential for meaningful change following its correction. While this is likely to be true in any case, the involvement of ACM-1 in this case adds gravitas to the results.

The patient's improved sleep and greater capacity for activities of daily living may reflect a combination of Chiropractic care and the general wellness guidance provided. However, it is notable that the patient made relatively limited lifestyle changes during the care period and did not significantly increase her physical activity level, suggesting that the objective and functional gains observed are more likely attributable to the Chiropractic intervention than to lifestyle modification alone.

The management of patients with known ACM-1 and craniocervical instability requires careful clinical reasoning and technique selection. The KCUC technique, with its low-force toggle-recoil adjustment and thermography-guided approach, was selected in part for its specificity and relatively gentle nature compared with high-velocity rotational cervical manipulation. As noted in the broader Chiropractic literature on this condition, extension of the upper cervical spine during adjustment should be avoided in patients with ACM-1 to minimise potential irritation at the foramen magnum. The clinical management of this patient proceeded without adverse events throughout the care period.

Conclusion

As a single case report, the findings cannot be generalised to the broader ACM-1 population. Patient consistency with appointments represented a logistical limitation during the care plan, with some interruptions to the intended schedule. With this considered, the patient made significant improvements and this is of note, especially if it assists her in avoiding surgery. However given the paucity of chiropractic literature on the topic, the prevalence of the condition and the proportion of patients who continue to experience post-surgical residual symptoms, further research is required in order to give chiropractors the ability to make confident claims as to Chiropractic's effect on ACM.

This report adds to the limited body of chiropractic literature on this condition and highlights the potential value of subluxation-based upper cervical care as a conservative management option for patients with ACM-1 and associated sequelae.

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About the Chiropractor

Dr Shaan Rai graduated with a Master of Chiropractic (AECC, UK) in 2014. He then worked in a practice outside of London before moving to South-East Asia to begin practicing as a Chiropractor in 2016. Vitality Chiropractic Centres was founded to provide Singapore with its first Upper Cervical focused practice, a dedicated migraine and vertigo specialist centre.

Shaan has experience working with patients from 2 weeks old to over 90 years old, with patients in wheelchairs to professional athletes. In addition to clinical practice, Dr Shaan has met with the *World Health Organisation*, lobbying on the topic of furthering Chiropractic research. He is an active member of the *Alliance of Chiropractic (Singapore)*, and serves as the Vice President and Chairman for Charity and Community Outreach for the association. He has also completed post-graduate study in: Atlas Orthogonal, Blair Upper Cervical, NUCCA (National Upper Cervical Chiropractic Association), KCUCS (Knee Chest Upper Cervical Specific), BGI (Bio Geometric Integration), TPI (Titleist Performance Institute – Golfers), MLS Adjusting, and Syntropy Adjusting.

In his free time, Shaan enjoys golf, skiing and being in nature (as well as trying new food!) When he's not busy with his patients, he volunteers to help migrant workers through SDI (Singapore), Centre for Domestic Employees (CDE), Singapore Special Olympics team, HOME, AIDHA and mission trips in Philippines.

About the Case Report project

This Case Report is a part of the [ASRF Case Report Project](#), 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 valuable project is made possible by the generous fundraising and contributions of ASRF supporters.

