Journal of Case Reports and Scientific Images

E-ISSN: 2708-0064
P-ISSN: 2708-0056
IJCRS 2025; 7(2): 57-61
www.allcasereports.com
Received: 05-05-2025
Accepted: 07-06-2025

Narendra Lamichhane
a) Research Center of Experimental Acupuncture Science, Tianjin University of Traditional Chinese Medicine, Tianjin, 301617, China
b) Gandaki Ayurveda Hospital, Pokhara, 33700, Nepal

Dal Pozzo Lisa
Department of Integrative Medicine, Tianjin University of Traditional Chinese Medicine, Tianjin, 301617, China

Ishwar Gyawali
a) Liaoning University of Traditional Chinese Medicine, Shenyang, 110847, China
b) Blue lotus Hospital, Kathmandu, 44600, Nepal

Kamal Sharma
a) Nanjing University of Traditional Chinese Medicine, Nanjing, 210023, China
b) Blue lotus Hospital, Kathmandu, 44600, Nepal

Corresponding Author:
Narendra Lamichhane
a) Research Center of Experimental Acupuncture Science, Tianjin University of Traditional Chinese Medicine, Tianjin, 301617, China
b) Gandaki Ayurveda Hospital, Pokhara, 33700, Nepal

Combined acupuncture and Shirodhara therapy for refractory pediatric migraine: A case report

Narendra Lamichhane, Dal Pozzo Lisa, Ishwar Gyawali and Kamal Sharma

DOI: https://www.doi.org/10.22271/27080056.2025.v7.i2b.142

Abstract
Pediatric migraine is a prevalent neurological disorder that significantly impacts quality of life and academic performance. While conventional pharmacological treatments are commonly used, their limited efficacy and potential side effects have increased interest in complementary therapies. Acupuncture, a Traditional Chinese Medicine technique, and Shirodhara, an Ayurvedic therapy, have shown individual promise in headache management, but their combined use in pediatric migraine remains understudied.
This case report examines a 14-year-old female with treatment-resistant migraines unresponsive to multiple medications. Following diagnosis of Liver Yang Rising (TCM) and Pitta-Vata imbalance (Ayurveda), she underwent an integrative treatment protocol of 20 acupuncture sessions targeting Liver Yang sedation and Yin nourishment, combined with Shirodhara therapy using Brahmi oil over six weeks. Clinical outcomes were measured using standardised scales for pain intensity, disability, sleep quality, and emotional stress.
Results showed substantial improvement, headache intensity decreased by 75%, migraine-related disability reduced by 71.4%, and headache frequency declined from daily to once weekly. Significant enhancements in sleep quality and emotional well-being were also observed.
The combined acupuncture and Shirodhara approach proved effective for this refractory pediatric migraine case, offering a promising non-pharmacological alternative. These findings highlight the potential of integrative therapies in pediatric neurology and warrant further investigation through controlled studies.

Keywords: Migraine, acupuncture, Shirodhara, Ayurveda, traditional Chinese medicine

Introduction
Migraine is a common neurological disorder in the pediatric population, affecting approximately 7.7% of children and adolescents worldwide [1], characterized by recurrent episodes of moderate to severe headaches, often accompanied by nausea, vomiting, and sensitivity to light and sound. Pediatric migraines can significantly impair a child's quality of life, academic performance, and social functioning [2]. Conventional treatment typically involves pharmacological interventions, including analgesics, antiemetics, and prophylactic medications such as beta-blockers or antiepileptics [3]. However, concerns regarding side effects, long-term dependency, and variable efficacy have prompted interest in complementary and alternative medicine (CAM) approaches, particularly in pediatric care.
Acupuncture, a key component of Traditional Chinese Medicine (TCM), has gained recognition as a potential therapy for migraine management. By stimulating specific points along meridians, acupuncture may modulate pain pathways, reduce inflammation, and improve cerebral blood flow [4]. Furthermore, acupuncture near ST36 increases extracellular adenosine, a neuromodulator with neuroprotective, anti-inflammatory, and analgesic effects, which may contribute to migraine relief [5]. Meanwhile, Shirodhara, an Ayurvedic therapy involving the continuous pouring of medicated oil over the forehead, is believed to induce deep relaxation, balance the nervous system, and alleviate stress-related headaches [6]. A study has demonstrated that migraine involves serotonin and other neurotransmitter abnormalities, as well as altered metabolism [7], while Shirodhara may exert therapeutic effects by normalizing serotonin and norepinephrine levels [8]. While both therapies have been individually studied for headache disorders, their combined use in pediatric migraine remains underexplored.
This case report presents the therapeutic effects of integrating acupuncture with Shirodhara in a pediatric patient with refractory migraines, highlighting a potential

synergistic approach for reducing headache frequency and severity while minimizing reliance on pharmacotherapy. The findings may contribute to the growing body of evidence supporting integrative strategies in pediatric neurology.

Case presentation

A 14-year-old female patient presented with a chronic history of bilateral, throbbing headaches persisting for three years, significantly impairing her academic performance and quality of life. These headaches were diagnosed as pediatric migraine, based on ICHD-3 diagnostic criteria [9], and normal findings on EEG and CT scan. Associated symptoms included photophobia, nausea, sleep disturbances, irritability, and cognitive sluggishness.

Despite having previously undergone multiple pharmacological treatments—including Codopar (paracetamol and codeine), Ciziron (cinnarizine), Pran (propranolol), Clonaz (clonazepam), and Anitone (amitriptyline)—administered at different time points, the patient experienced minimal or no therapeutic benefit before seeking alternative medical care.

The patient presented with a pattern of Liver Yang Rising, rooted in Liver and Kidney Yin deficiency and complicated by Liver Qi stagnation. Clinical findings included a wiry and rapid pulse and a tongue with red lateral borders and a thin yellow coating, further corroborating the diagnosis.

The Ayurvedic assessment revealed Pitta-Vataja Shirashoola with Mandagni and psychological imbalance. The patient's tongue was reddish and dry, and her pulse (nadi) displayed sharp, irregular, and superficial qualities typical of aggravated Pitta-Vata doshas.

A combined therapy plan of acupuncture and Shirodhara was employed. Acupuncture was administered over six weeks (20 sessions total), with 6 sessions per week in the first two weeks and 2 sessions per week for the next four weeks. Supplementary Table 1 summarizes the acupuncture point selection, anatomical location, and method of insertion.

Sterile single-use filiform needles (0.25 mm × 40 mm) were used. Manual stimulation (twirling, rotating) elicited *de Qi*, followed by reducing manipulation (rapid, vigorous technique) to subdue Liver Yang at excess-related points and tonifying manipulation (gentle technique) at Yin-nourishing points. Needles were retained for 40 minutes with mid-session manual reinforcement. No electroacupuncture or moxibustion was applied.

On the same days as acupuncture, the patient received Shirodhara therapy using warm Brahmi (*Bacopa monnieri*) oil prepared by baidhyanath company. The oil was gently poured over the Ajna marma (forehead center) for 30 minutes per session, supervised by an Ayurvedic physician. This procedure can pacify aggravated Pitta and Vata, support mental clarity, and enhance sleep [10].

The patient's progress was monitored using standardised measures: headache intensity (0-10 VAS, with ≥1.2-point reduction indicating clinically improvement) [11], migraine-related disability (MIDAS questionnaire) [12], and daily recordings of attack frequency/duration. MIDAS questionnaire is depicted in supplementary file 2. Secondary measures included 0-10 scales for sleep quality and emotional stress [13].

At baseline, the patient reported a VAS score of 8/10, which reduced to 2/10 after 6 weeks—a 75% reduction that exceeds the minimal clinically important difference (MCID) for pain, typically reported as 1.3-2.0 points. Similarly, the MIDAS score improved from 21 to 6 (-71.4%), remarkably the commonly accepted 30% threshold for meaningful improvement and reflecting a shift from severe to minimal disability. Sleep quality improved by 125% (from 4/10 to 9/10), emotional stress decreased by 63% (from 8/10 to 3/10), and headache duration was reduced from 4-5 hours daily to 1.5 hours once per week. Table 1 reports the clinical outcomes at baseline and after 6 weeks.

Table 1: Clinical Outcomes at Baseline and After 6 Weeks of Treatment

Outcome Measure	Baseline	After 6 Weeks	Absolute Change	% Change
VAS (0-10)	8	2	-6	-75%
MIDAS Score	21	6	-15	-71.4%
Sleep Quality (0-10)	4	9	5	+125%
Emotional Stress (0-10)	8	3	-5	-62.5%
Headache Frequency	Daily	1×/week	-6 days/week	-85.7%
Headache Duration	4-5 h/day	1.5 h/week	~ -26.5 h/week	~ -88%

There were no adverse effects during treatment. Functional improvement was evident: she returned to school regularly, participated in activities, and reported significant relief from emotional and physical symptoms. The patient and her family expressed strong satisfaction and chose to continue with weekly maintenance acupuncture for long-term stability.

Discussion

Pediatric migraine is a disabling neurovascular disorder characterized by recurrent, moderate-to-severe headache episodes often accompanied by nausea, photophobia, phonophobia, and psychological distress. It significantly interferes with daily functioning, academic performance, and emotional well-being in children and adolescents. In this case, a 14-year-old female with chronic pediatric migraine showed substantial clinical improvement following an integrative treatment protocol combining acupuncture therapy and Shirodhara.

Standard pharmacological management of pediatric migraine includes analgesics (e.g., paracetamol, NSAIDs), antiemetics, and preventive agents like propranolol, flunarizine, and amitriptyline. However, evidence suggests limited efficacy in many cases, and concerns about side effects, such as sedation, cognitive dulling, and gastrointestinal issues, often limit long-term use in children [14, 15]. In this case, the patient received a range of conventional medications, including propranolol, cinnarizine, amitriptyline, and clonazepam, but reported poor symptom control and adverse effects, including gastric discomfort and fatigue.

Acupuncture, rooted in Traditional Chinese Medicine (TCM), has gained growing acceptance for the treatment of headaches, including pediatric migraines. According to a

Cochrane review, acupuncture is at least as effective as prophylactic drug treatment for adult migraine, with fewer side effects [16]. Although pediatric-specific studies are fewer, pilot trials and case reports have shown promising outcomes. A study reported that acupuncture was associated with a significant reduction in both headache frequency and intensity in adolescents, with minimal adverse effects [17].

In this case, the selection of local and distal acupoints such as GB20, M-HN3, LI4, LR3, and SP6 was guided by the TCM diagnosis of Liver Yang Rising, Yin deficiency, and Qi stagnation, conditions commonly implicated in chronic headaches. The effectiveness of GB20 and LI4 in treating migraine has been documented in neuroimaging studies showing modulation of pain pathways, vasodilation, and endorphin release [18]. SP6 and ST36, known for their systemic regulatory effects, also help support digestive health, aligning with this patient's Mandagni (low digestive fire) from an Ayurvedic perspective [19].

Acupuncture stimulation has been shown to regulate autonomic nervous system function, reduce cortical hyperexcitability, and modulate serotonin levels, all of which play a role in migraine pathogenesis [20].

Shirodhara, an Ayurvedic external therapy involving continuous pouring of warm medicated oil over the forehead, particularly the Ajna Marma, has traditionally been used for nervous system disorders, including anxiety, insomnia, and headaches. In the Ayurvedic framework, the patient's condition was diagnosed as Pitta-Vataja Shirashoola, with an associated psychological imbalance and Mandagni.

Studies have found that Brahmi oil (*Bacopa monnieri*), used in this case, exhibits nootropic, anxiolytic, and antioxidant properties [21, 22]. A study reported that Shirodhara significantly reduces cortisol levels, improves sleep quality, and enhances mental clarity, supporting its use in stress-induced headache syndromes [23]. The integration of Shirodhara with acupuncture may exert synergistic effects, promoting parasympathetic dominance, restoring circadian rhythm, and regulating neurotransmitters involved in migraine pathophysiology, such as GABA and serotonin [24].

This case reflects the value of integrative medicine—which combines conventional healing systems—in treating chronic pediatric conditions where biopsychosocial factors play a major role. The use of both TCM and Ayurveda allowed for a more nuanced understanding of the patient's condition and facilitated targeted interventions that addressed both the physiological and emotional domains.

The clinical outcomes in this case—marked reduction in headache frequency and intensity, improved sleep, emotional balance, and return to normal school functioning— align with findings from other integrative headache studies. Palak *et al*. noted significant improvement in the quality of life and reduced medication use among adolescents receiving complementary therapies for migraine [25]. Furthermore, the absence of side effects and high patient satisfaction observed here align with existing literature highlighting the safety profile of acupuncture and Shirodhara in pediatric populations [25, 26].

This case report has several limitations. Being a single case without a control group, the observed improvements may partly reflect placebo effects or natural fluctuations in migraine patterns. The combined use of acupuncture and Shirodhara also makes it difficult to isolate the specific effect of each therapy. Additionally, the short-term follow-up does not provide information about long-term benefits or recurrence.

Further research involving larger sample sizes, randomized controlled trials, and longer follow-up periods is needed to validate the effectiveness and safety of integrative approaches for pediatric migraine. Investigations into the underlying mechanisms of action through neurophysiological or biochemical studies could also enhance understanding.

Conclusion

In conclusion, this case suggests that an integrative approach using acupuncture and Shirodhara may offer safe and effective relief for pediatric migraine, especially in cases unresponsive to conventional medications. The positive outcomes and high patient satisfaction point toward the potential of integrative therapies as supportive strategies in pediatric headache management.

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Supplementary File 1

Acupuncture Point	Location	Method of Insertion
GB20 (Fengchi)	In the depression between the sternocleidomastoid (SCM) and trapezius muscles, at the level of the posterior hairline.	Oblique insertion, 0.5-1.0 cun toward the contralateral eye (or nose).
EX-HN5 (Taiyang)	In the temple, ~1 cun posterior to the midpoint between the lateral end of the eyebrow and the outer canthus.	Perpendicular or oblique, 0.3-0.5 cun. (Avoid deep needling due to risk of temporal artery injury.)
M-HN3 (Yintang)	Midpoint between the medial ends of the eyebrows.	Subcutaneous (transverse), 0.3-0.5 cun, directed downward or toward the nose.
GB8 (Shuaigu)	1.5 cun directly above the apex of the ear, in a slight depression.	Oblique insertion, 0.5-1.0 cun along the scalp.
GV20 (Baihui)	On the midline, 7 cun above the posterior hairline (or 5 cun posterior to the anterior hairline).	Perpendicular, 0.5-1.0 cun, or subcutaneous insertion.
LI4 (Hegu)	On the dorsum of the hand, between the 1st and 2nd metacarpal bones, at the midpoint of the 2nd metacarpal bone (closer to the radial side).	Perpendicular, 0.5-1.0 cun (avoid deep needling toward the palm to prevent puncture of the deep palmar arch).
LR3 (Taichong)	On the dorsum of the foot, in the depression proximal to the 1st and 2nd metatarsal joints.	Perpendicular, 0.5-1.0 cun.
ST36 (Zusanli)	3 cun below ST35 (Dubì, lateral to the patella), one finger-breadth lateral to the anterior tibial crest.	Perpendicular, 1.0-1.5 cun (some sources allow up to 2 cun in thicker tissues).
SP6 (Sanyinjiao)	3 cun above the medial malleolus, posterior to the tibia (in the depression near the medial border of the tibia).	Perpendicular, 0.5-1.2 cun (avoid deep needling in pregnant women).
PC6 (Neiguan)	2 cun proximal to the transverse wrist crease, between the tendons of palmaris longus and flexor carpi radialis.	Perpendicular, 0.5-1.0 cun.
KI3 (Taixi)	In the depression between the medial malleolus and the Achilles tendon, level with the tip of the malleolus.	Perpendicular, 0.5-0.8 cun.
BL62 (Shenmai)	In the depression directly below the lateral malleolus.	Perpendicular or oblique, 0.3-0.5 cun.
SI3 (Houxi)	At the ulnar end of the distal palmar crease, proximal to the 5th metacarpophalangeal (MCP) joint, in the depression when making a loose fist.	Perpendicular, 0.5-0.8 cun (or up to 1.0 cun for deeper stimulation).

Supplementary File 2

Migraine Disability Assessment Test (MIDAS)

Purpose: To measure the impact of headaches on your daily life and guide treatment decisions.

Instructions: Answer the following questions about ALL headaches over the last 3 months. Enter the number of days in the boxes. Mark "0" if the activity did not apply. Bring this completed form to your healthcare provider.

Question	Number of Days (✓)
1. Days missed at work/school due to headaches.	□
2. Days with productivity at work/school reduced by ≥50%. (Exclude days missed in Q1).	□
3. Days household work was not done due to headaches.	□
4. Days household productivity reduced by ≥50%. (Exclude days in Q3).	□
5. Days missed family/social/leisure activities due to headaches.	□

Total Score (Sum of Q1-Q5)

Additional Clinician Information

a) Total headache days in the last 3 months (count each day of a multi-day headache). □
b) Average pain severity (0-10 scale, where 0=no pain, 10=worst imaginable).

Scoring & Interpretation

MIDAS Grade	Disability Level	Score Range
Grade I	Little/No Disability	0-5
Grade II	Mild Disability	6-10
Grade III	Moderate Disability	11-20
Grade IV	Severe Disability	21+

Action: If your score is ≥6, consult your doctor for further evaluation.

How to Cite This Article

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