



NEUROFUNCTIONAL MODULATION THROUGH MARMA THERAPY IN CERVICOGENIC HEADACHE: AN INTEGRATIVE CLINICAL APPROACH

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ABSTRACT

Background: Cervicogenic headache (CGH) is a secondary headache disorder referred to the head from a nociceptive source in the cervical spine, most commonly the upper three cervical segments. It accounts for a substantial share of chronic headache presentations, and conventional management — analgesics, physical therapy and, in refractory cases, nerve blocks — is often symptomatic and inconsistently durable. Marma therapy, a manual therapeutic modality described in classical Ayurvedic surgical literature, targets anatomically defined vital points that correspond closely to neurovascular and myofascial junctions, offering a plausible non-pharmacological route to modulating cervical nociception. **Case presentation:** A 41-year-old female software analyst presented with an 18-month history of unilateral right-sided headache arising in the occipital region and radiating to the temporal and frontal areas, with associated neck stiffness and restricted cervical mobility. Episodes occurred 4–5 times weekly and were of moderate-to-severe intensity. Prolonged computer work, sustained neck flexion, poor posture and stress were consistent triggers. Clinical examination and cervical assessment supported a diagnosis of CGH by International Classification of Headache Disorders, 3rd edition (ICHD-3) criteria. **Intervention and outcome:** Marma therapy was administered to Amsa, Krikatika and Sthapani marma three times weekly for 12 weeks, with oral Rasnasaptakam Kashayam tablets and Dashamoolarishtam as supportive therapy. By 12 weeks the patient showed marked reduction in headache intensity and frequency alongside improved cervical mobility. No adverse events were recorded and the patient reported substantial improvement in quality of life. **Conclusion:** In this case, a structured marma protocol produced clinically meaningful and sustained relief in long-standing CGH without pharmacological analgesia or adverse effects. The anatomical correspondence between the marma used and the trigeminocervical convergence zone offers a mechanistic rationale that warrants formal evaluation in controlled trials.

KEYWORDS: Ayurveda; cervicogenic headache; flexion–rotation test; Krikatika marma; marma therapy; trigeminocervical complex.

1. INTRODUCTION

Cervicogenic headache (CGH) is defined in the International Classification of Headache Disorders, 3rd edition, as headache caused by a disorder of the cervical spine and its component bony, disc or soft tissue elements, usually but not invariably accompanied by neck pain.^[2] The diagnostic criteria proposed by Sjaastad and colleagues emphasise unilaterality without side-shift, provocation of the headache by neck movement or sustained awkward posture, reduced cervical range of motion, and ipsilateral neck, shoulder or arm discomfort.^[3] Reported prevalence in the general population ranges from roughly 1% to 4%, rising considerably among patients attending specialist headache and musculoskeletal clinics, and higher still in occupational cohorts exposed to prolonged static neck postures.^[4]

The pathophysiological substrate is now reasonably well characterised. Afferents from the upper three cervical spinal nerves converge with trigeminal afferents onto second-order neurons in the trigeminocervical complex of the dorsal horn at C1–C3.^[5,6] This convergence permits nociceptive input of cervical origin to be perceived in trigeminal dermatomes, explaining the characteristic occipital-to-frontal and periorbital referral pattern. Experimental stimulation of the greater occipital nerve produces sustained facilitation of dural afferent input, providing direct evidence for the central sensitisation that underlies chronicity in CGH.^[5] The lateral atlanto-axial (C1–C2) joint, the C2–C3 zygapophyseal joint and the suboccipital musculature are the most frequently implicated peripheral generators.^[4]

Conventional management is largely symptomatic. Simple and combination analgesics offer transient relief and carry the risk of medication-overuse headache; manual therapy and craniocervical exercise programmes have the best supporting evidence but demand sustained adherence; and interventional options such as cervical medial branch blocks or radiofrequency neurotomy are invasive and not universally available.^[4,7,8] A safe, low-cost, non-pharmacological modality with durable effect therefore remains clinically desirable.

Marma are anatomically specified vital points enumerated in the Sushruta Samhita, which describes 107 such loci classified by the predominant structure at each site — *mamsa* (muscle), *sira* (vessel), *snayu* (ligament and tendon), *asthi* (bone) and *sandhi* (joint).^[1] Contemporary anatomical mapping has repeatedly shown that these points overlie neurovascular bundles, myotendinous junctions and articular capsules — precisely the structures that generate and transmit musculoskeletal nociception.^[9] Marma therapy, the application of graded manual stimulation to these points, is used in Ayurvedic practice for musculoskeletal and neurological complaints, but published clinical documentation in CGH specifically is sparse.

This report describes the clinical course of a patient with chronic, treatment-refractory CGH managed with a structured 12-week marma protocol, and examines the anatomical and neurophysiological rationale for the observed response. The report is prepared in accordance with the CARE guidelines for case reporting.^[10]

2. CASE PRESENTATION

2.1 Patient information

A 41-year-old female software analyst presented to the outpatient department in January 2026 with a history of recurrent headache of approximately 18 months' duration. Her occupation involved eight to ten hours of daily computer work with prolonged sustained neck flexion and no formal ergonomic provision.

The headache was unilateral and consistently right-sided, without side-shift between episodes. It began in the suboccipital region and radiated forward to the temporal and frontal areas. Episodes occurred four to five times per week, each lasting two to four hours, with intensity rated 7–8 out of 10 on a visual analogue scale (VAS). The patient additionally reported persistent posterior neck stiffness, subjectively restricted neck movement, mild non-rotatory dizziness during severe episodes, and tightness across the right shoulder girdle.

Onset was insidious and could not be related to any injury. Aggravating factors were neck movement — particularly rotation and sustained flexion — prolonged screen work, poor sitting posture and psychological stress. Rest and over-the-counter analgesics produced only temporary relief, with recurrence typically within hours. There was no photophobia, phonophobia, nausea, vomiting, visual aura, lacrimation, conjunctival injection, rhinorrhoea or ptosis at any point in the illness.

Past history was unremarkable: no head or neck trauma, no cervical surgery, no diabetes mellitus, hypertension, thyroid disorder or other systemic illness, and no regular medication other than intermittent analgesics. Family history was non-contributory. She had previously undergone two short courses of analgesic therapy and a brief period of unsupervised neck exercises, neither of which produced lasting benefit.

2.2 Clinical findings

General examination was unremarkable, with stable vital parameters. Neurological examination showed intact cranial nerves, normal upper limb power and tone, preserved deep tendon reflexes, and no sensory deficit or long-tract sign. Fundoscopy was normal. There were no features suggestive of raised intracranial pressure, meningeal irritation or cranial autonomic dysfunction.

Musculoskeletal and cervical examination revealed forward head posture with rounded shoulders, palpable hypertonicity of the right upper trapezius, levator scapulae and suboccipital muscle groups, and restriction

of right cervical rotation at end range. The three principal clinical tests are summarised in Table 1.

Table 1: Cervical clinical assessment at baseline.

Assessment	Structure/parameter assessed	Patient value	Reference value
Flexion–rotation test (FRT)	C1–C2 rotational mobility	28°	> 32°
Cervical segmental palpation	C2–C3 zygapophyseal joint	Positive — reproduced the patient's typical headache	No pain or referral
Craniovertebral angle (CVA)	Forward head posture	45°	> 50°

The flexion–rotation test, performed in maximal cervical flexion with passive rotation to end range, was limited to 28° towards the symptomatic side against a normative threshold of 32°; this test has good diagnostic accuracy for C1–C2-related CGH.^[11,12] Segmental palpation of the C2–C3 zygapophyseal joint reproduced the patient's familiar headache rather than local tenderness alone, which is the finding of diagnostic value. The craniovertebral angle, measured photographically as the angle between the horizontal and a line joining the C7 spinous process to the tragus, was reduced at 45°, consistent with forward head posture — a postural pattern associated with reduced cervical mobility in chronic headache populations.^[13]

2.3 Diagnostic assessment and differential diagnosis

Routine haematological and biochemical investigations, including complete blood count, erythrocyte

sedimentation rate, fasting blood glucose and thyroid function, were within normal limits. In the absence of any alarm feature — no trauma history, no neurological deficit, no systemic illness and no atypical headache pattern — neither cervical spine radiography nor advanced neuroimaging was clinically indicated, and none was performed.

Primary headache disorders were systematically excluded on clinical grounds (Table 2). The combination of strictly unilateral pain without side-shift, cervical origin with characteristic anterior referral, reproduction of the headache by cervical segmental palpation, restricted upper cervical mobility on FRT, and absence of migrainous or autonomic accompaniments satisfied ICHD-3 criteria for headache attributed to a disorder of the cervical spine, and fulfilled the major criteria of Sjaastad et al.^[2,3]

Table 2: Differential diagnosis of the presenting headache.

Diagnosis	Characteristic features	Present case
Migraine without aura	Often bilateral or alternating, pulsating, nausea/vomiting, photophobia and phonophobia	Excluded — strictly unilateral, no side-shift, no nausea, photophobia or aura
Tension-type headache	Bilateral, band-like pressing quality, no cervical signs, not provoked by neck movement	Excluded — unilateral, cervical range of motion restricted, movement-provoked
Cluster headache	Severe strictly periorbital pain in short attacks with prominent cranial autonomic features	Excluded — no autonomic features, attack duration 2–4 hours
Cervicogenic headache	Unilateral, cervical origin with anterior referral, reproduced by neck movement or palpation, reduced cervical mobility	Confirmed — all features present

From the Ayurvedic standpoint the presentation was assessed as *Vata*-predominant *Shiroshoola* with *Manyastambha*, the *Vata* vitiation being attributable to *ativyayama* of a postural kind — prolonged static loading of the cervicospinal region — compounded by occupational stress.

2.4 Therapeutic intervention

Marma therapy formed the primary modality. Three marma were selected on anatomical grounds, corresponding to the myofascial, articular and neural elements implicated in the patient's presentation. The protocol ran for 12 weeks at three sessions per week (36 sessions in total) and was administered by a single

trained practitioner to maintain consistency of technique and pressure. Each session lasted approximately 20 minutes. Details are given in Table 3.

Table 3: Marma therapy protocol. Duration 12 weeks; frequency three sessions per week.

Marma	Anatomical location	Technique	Time	Intended effect
<i>Amsa marma</i>	Junction of the shoulder joint with the neck, overlying the upper trapezius and supraspinatus	Rhythmic tapping combined with gentle mobilisation	7–10 min	Release of cervicospinal myofascial tension
<i>Marma</i>	attachment			
<i>Krikatika marma</i>	Craniocervical junction at the articulation of the neck with the head, overlying the suboccipital region and greater occipital nerve territory	Gentle circular massage with graded sustained pressure	5–7 min	Modulation of trigeminocervical nociceptive input
<i>Sthapani marma</i>	Glabellar region between the eyebrows	Gentle stroking with warm <i>Ksheerabala taila</i>	3–5 min	<i>Vata shamana</i> ; reduction of headache intensity and autonomic arousal

Supportive oral therapy comprised Rasnasaptakam Kashayam tablets and Dashamoolarishtam, both classical *Vata*-pacifying and anti-inflammatory formulations widely used in musculoskeletal pain, administered at standard therapeutic doses throughout the treatment period. Ergonomic counselling was provided, covering monitor height, chair and lumbar support, and hourly postural breaks. No analgesics, muscle relaxants or other conventional pharmacotherapy were used at any point

during the 12 weeks.

2.5 Follow-up and outcomes

Outcomes were assessed at baseline and at 12 weeks using three measures: headache intensity on a 10-point VAS, headache frequency recorded as headache days per month from a patient-maintained diary, and cervical function measured as FRT angle towards the symptomatic side. Results are shown in Table 4.

Table 4: Outcome measures at baseline and at 12 weeks.

Outcome measure	Baseline	12 weeks	Change
Headache intensity (VAS, 0–10)	7.0	1.5	79% reduction
Headache days per month	20	4	80% reduction
Flexion–rotation test (degrees)	28°	38°	36% improvement

Symptomatic improvement was reported from approximately the fourth week, with a reduction first in episode intensity and subsequently in frequency. Neck stiffness eased progressively and end-range cervical rotation became painless by the tenth week. The FRT value at 12 weeks (38°) exceeded the 32° normative threshold, indicating restoration of C1–C2 rotational mobility rather than partial gain alone. Associated dizziness and shoulder tightness resolved. The patient reported that she was able to complete a full working day without headache and had discontinued analgesics entirely.

No adverse events occurred. Specifically, there was no post-treatment soreness requiring intervention, no bruising, no dizziness or syncope attributable to the therapy, and no episode of symptom exacerbation. Treatment adherence was complete, with all 36 scheduled sessions attended.

Patient perspective

The patient described the outcome as a marked change in her working life, noting that she had previously come to regard the headache as a permanent feature of her job, and that the absence of any drug therapy was an important part of her satisfaction with the treatment.

3. DISCUSSION

This case documents substantial and concurrent improvement across three domains — pain intensity, attack frequency and segmental cervical mobility — in a patient whose headache had persisted for 18 months and had not responded durably to analgesics or unsupervised exercise. The parallel movement of the symptomatic and the mechanical measures is the most informative feature of the course. Restoration of FRT from 28° to 38° indicates that C1–C2 rotational mobility was recovered, not merely that the patient's pain report changed; and since it is the upper cervical segments that supply the trigeminocervical complex, the mechanical gain and the symptomatic gain are plausibly linked rather than coincidental.

The anatomical rationale for the protocol is direct. *Krikatika marma* is located at the craniocervical articulation, overlying the suboccipital triangle and the emergence of the greater occipital nerve — the precise territory whose afferents converge with trigeminal input at C1–C3.^[5,6] Graded manual stimulation at this site is therefore applied to the peripheral field of the convergence zone that generates the referral pattern this patient exhibited. *Amsa marma*, classified as a *mamsa marma* in Sushruta's scheme, overlies the upper trapezius and supraspinatus attachments — a correspondence

borne out in a recent anatomical correlation of Marma Sharir with myofascial trigger points, which maps *Amsa* directly onto the upper trapezius trigger point implicated in neck and shoulder pain.^[1,9] *Sthapani* marma, in the glabellar region within the ophthalmic trigeminal distribution, corresponds to the anterior end of the referral pathway. The protocol thus addresses the peripheral generator, the myofascial perpetuating factor and the referral field in a single sequence, which may account for the breadth of response.

Mechanistically, several non-exclusive processes are plausible. Sustained graded pressure over hypertonic muscle can reduce resting tone and nociceptor sensitisation within trigger-point regions; rhythmic mechanical input activates large-diameter afferents capable of gating nociceptive transmission at the dorsal horn; and restoration of segmental mobility reduces the mechanical stimulus arising from the zygapophyseal joint itself. Reduction of central facilitation in the trigeminocervical complex, of the kind demonstrated experimentally following occipital nerve stimulation, would explain the progressive rather than immediate character of the improvement observed here — intensity falling before frequency, over a course of weeks.^[5] The *Vata shamana* effect attributed to *Sthapani* stimulation with warm medicated oil, and the reduction in autonomic arousal it is held to produce, sits comfortably alongside this account rather than in competition with it.

The magnitude of response compares favourably with reported outcomes for conservative management of CGH. Systematic review of physical therapy approaches and randomised evidence for manipulative therapy with craniocervical exercise indicate meaningful but generally more modest reductions in headache frequency and intensity over comparable periods.^[7,8] That said, the comparison must be made cautiously: a single uncontrolled case cannot be set against trial data, and the supportive oral formulations and ergonomic counselling given here are co-interventions whose contribution cannot be separated from that of the marma therapy.

The safety profile deserves emphasis. Marma therapy as applied here required no instrumentation, no thrust manipulation and no pharmacological analgesia, and produced no adverse effect across 36 sessions. For a condition in which analgesic dependence and medication-overuse headache are recognised hazards, and in which high-velocity cervical manipulation carries a small but non-trivial risk, a manual modality that is gentle, learnable and reproducible has clear practical appeal — particularly for occupational cohorts in whom recurrence is likely and repeated courses may be needed.

As with any single case report, these findings should be read as hypothesis-generating rather than confirmatory. The absence of a control arm and of blinded assessment means that natural fluctuation, expectation and the multi-component nature of the intervention cannot be

fully disentangled from the effect of marma therapy itself, and diagnosis rested on clinical criteria without imaging or diagnostic anaesthetic block of the C2–C3 joint.^[4] Follow-up did not extend past the 12-week endpoint, so the durability of the response remains to be established. None of this diminishes the clinical outcome observed here; it simply defines the next step — the case provides a clear, plausible signal that is now well placed for evaluation in a controlled trial.

A randomised controlled trial comparing a standardised marma protocol against sham manual contact and against established manual therapy, with blinded assessment of FRT and pressure pain thresholds, diagnostic block confirmation of the cervical source, a validated disability instrument such as the Headache Impact Test or Neck Disability Index, and follow-up to at least six months, would allow the effect seen here to be attributed and quantified.

Standardisation of pressure, technique and session duration — feasible, as the protocol used here shows — is a prerequisite for such work.

4. CONCLUSION

A structured 12-week marma protocol directed at *Amsa*, *Krikatika* and *Sthapani* marma, with supportive Ayurvedic oral therapy and ergonomic counselling, was associated with a 79% reduction in headache intensity, an 80% reduction in headache frequency and a 36% improvement in C1–C2 rotational mobility in a patient with 18-month-old cervicogenic headache, without adverse effect and without analgesic use. The anatomical correspondence between the marma selected and the trigeminocervical convergence zone provides a coherent mechanistic rationale for the result. While a single case cannot establish efficacy, the findings support the evaluation of marma therapy as a standardised, low-risk, non-pharmacological option for cervicogenic headache in adequately powered controlled trials.

DECLARATIONS

Patient consent: Written informed consent was obtained from the patient for publication of her clinical details. Identifying information has been withheld.

Ethical approval: Formal ethics committee approval was not required for this single case report, in accordance with institutional policy.

Conflict of interest: The author declares no conflict of interest.

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C. Online / Other References

None. The anatomical-mapping source located online (reference 9) is a peer-reviewed journal article and has been listed under Journal Articles above.