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Ayurvedic Medications in the Treatment of Amyotrophic Lateral Sclerosis / Motor Neuron Disease: Kashayas, Medicated Oils, Bhasmas and Allied Therapies - A Narrative Review

Dr. Mohamed Afzal Pasha, Ph. D.*
Professor (Retired), Department of Chemistry, Bangalore University-560056, INDIA

*Present address: Chief-Editor, ESRA Publications Pvt. Ltd., Bangalore-560094, INDIA
e-mail: chief.editoresra@gmail.com

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ABSTRACT

Background: Amyotrophic lateral sclerosis (ALS), the commonest form of motor neuron disease (MND), is a relentlessly progressive disorder with a median survival of two to four years from onset [1,2]. Riluzole and edaravone offer modest benefit [3,4], and patients and families in India and elsewhere increasingly turn to Ayurveda.

Aim: To catalogue, in detail, the Ayurvedic therapies used or proposed for ALS/MND, namely Panchakarma and external procedures, kashayas (decoctions), medicated oils (taila) and ghee (ghrita), bhasmas and herbo-mineral preparations, and Rasayana herbs, and to appraise the evidence for their efficacy and safety.

Methods: Narrative review of classical texts, the Ayurvedic Formulary of India, product compositions, and the peer-reviewed clinical and preclinical literature on Ayurvedic interventions in ALS/MND.

Results: ALS is most often interpreted within Vatavyadhi (Kaphavrita Udana or Vyana vata; Dhatukshayajanya Ekangavata; Majjagata vata). Published clinical evidence is limited to single-patient reports, one of which recorded an ALSFRS-R rise from 26 to 34 [5]. Controlled evidence exists only for constituents of Ayurvedic materia medica: nanocurcumin add-on to riluzole in a 54-patient pilot trial (events 1/27 versus 6/27) [6], and animal and *Drosophila* models showing that *Withania somnifera* and withaferin A reduce NF-κB signalling, TDP-43 and misfolded SOD1 burden [7–9]. No randomised trial of any classical Ayurvedic formulation in ALS has been identified. Several mineral preparations carry a risk of lead or mercury exposure, which is of particular concern in a neurotoxicity-sensitive disease [10,11].

Conclusions: Ayurvedic preparations are biologically plausible adjuncts whose benefit in ALS is unproven. Rigorous, standardised, safety-tested studies are required before any claim of disease modification can be made; in the interim they should supplement, never replace, evidence-based multidisciplinary care.

Key words: Amyotrophic lateral sclerosis; motor neuron disease; Ayurveda; Vatavyadhi; Panchakarma; kashaya; taila; bhasma; Withania somnifera; Rasayana.

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1. Introduction

Amyotrophic lateral sclerosis is a neurodegenerative disease in which upper and lower motor neurons are progressively lost, producing weakness, wasting, spasticity, dysarthria, dysphagia and, finally, respiratory failure. Incidence is roughly two per 100,000 person-years in populations of European ancestry, with lower estimates reported from Asian populations [12]. The median survival from symptom onset is two to four years, although a minority survive much longer [1,2].

Disease-modifying therapy remains limited. Riluzole confers a modest survival benefit [3,13]; edaravone slowed functional decline in a carefully selected population [4]; and the antisense oligonucleotide tofersen lowers SOD1 protein and neurofilament light chain in SOD1-ALS [14]. For the great majority of patients, who have sporadic disease, the options are symptomatic and supportive.

In this setting Ayurveda, India's classical system of medicine, is frequently sought. Its literature on Vatavyadhi (disorders of Vata) describes paralytic, wasting and stiffening syndromes that overlap clinically with MND [15–17]. Ayurvedic management combines purificatory and nourishing procedures (Panchakarma), compound decoctions (kashayas), medicated oils and ghee, mineral-derived bhasmas, and Rasayana (rejuvenative) herbs. Because these interventions are used in practice, often alongside or instead of riluzole, a critical, chemistry-informed inventory of what is actually being given, on what theoretical basis and with what evidence, is overdue.

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This review therefore (i) maps ALS onto the Ayurvedic disease framework, (ii) lists the procedures, kashayas, oils, ghee preparations, bhasmas and herbs used in Vatavyadhi and relevant to MND with their compositions, (iii) summarises the clinical and preclinical evidence, (iv) examines safety and quality, and (v) proposes a research agenda. It does not recommend any Ayurvedic treatment as a cure.

2. Scope and Methods of the Review

This is a narrative, not a systematic, review. Classical descriptions were drawn from the Charaka, Sushruta and Ashtanga Hridaya treatises [15–17], the Bhaishajya Ratnavali [18], the Sahasrayogam [19] and the Ayurvedic Formulary of India [20]. Compositions of commonly used formulations were cross-checked against current Indian market product labels [21]; because botanical identity and ingredient lists vary between manufacturers and regions, the tables give abridged principal ingredients and should not be used as manufacturing formulae. Clinical and preclinical reports on Ayurvedic interventions or Ayurvedic-derived constituents in ALS/MND were identified through targeted searches of indexed and open-access sources up to October 2026. Case reports on conditions other than ALS (for example Hirayama disease) are identified as such. Evidence has been graded descriptively (Figure 5), and no quantitative pooling was attempted.

3. ALS Pathobiology Relevant to Therapeutic Targeting

Several converging mechanisms underlie motor neuron death: oxidative stress and impaired redox defence [22]; aggregation and mislocalisation of RNA-binding proteins such as TDP-43, and misfolding of SOD1 [23]; glutamate excitotoxicity, the putative target of riluzole [3]; neuroinflammation with microglial and astrocytic activation and NF-κB signalling [7,9]; mitochondrial dysfunction; and failure of autophagy and proteostasis [23]. These pathways define the biological hypotheses against which Ayurvedic agents have been, or can be, tested (Figure 2).

4. ALS/MND in the Ayurvedic Framework

4.1 Disease correlation

ALS does not have a single named counterpart in the classical texts. Practitioners map it onto Vatavyadhi, with the exact diagnosis depending on the dominant features. A report on a patient with weakness, speech difficulty, heaviness, anorexia and loss of skin lustre interpreted the picture as Kaphavrita Udana vata and treated it accordingly [24]. Another group diagnosed a 75-year-old man with rapidly progressive ALS as Dhatukshayajanya Ekangavata, treating him with a Vatahara regimen followed by Rasayana [5]. A third report discusses Sarvanga vata, Avrita vata and Sama vata as possible labels and highlights the diagnostic and therapeutic uncertainty [25]. Table 1 summarises the proposed correlations.

Table 1. Proposed Ayurvedic correlations of the clinical features of ALS/MND (interpretive; not established equivalences).

Clinical feature in ALS/MND	Ayurvedic term (proposed correlation)	Dosha / dhatu involvement
Progressive muscle wasting (amyotrophy)	Mamsa kshaya; Mamsa-dhatu kshaya	Vata increase; depletion of mamsa and majja dhatu
Weakness, heaviness, loss of limb power	Daurbalya; Sarvagatra-gurutva; Gatra sada; Pakshaghata / Ekangavata / Sarvangavata (regional or generalised)	Vata with or without Kapha avarana (Kaphavrita Udana / Vyana vata)
Fasciculations, cramps	Sphurana; Sira-snayu akshepa	Vata in snayu and sira
Spasticity, stiffness (upper motor neuron signs)	Stambha; Snayugata vata	Vata (ruksha, khara guna) in snayu
Dysarthria, slurred or nasal speech	Vak-swara-graha; Vak-sanga	Udana vata, Kapha avarana
Dysphagia, drooling (bulbar onset)	Galagraha; Annavarodha; Lalasrava	Udana and Prana vata; Kapha
Anorexia, loss of lustre of skin	Aruchi; Vaivarnya	Kapha avarana of Udana vata (as in the Kaphavrita-Udanavata report [24])
Respiratory muscle weakness	Shwasa-kricchrata (Prana-Udana vata impairment)	Vata; Pranavaha srotas
Sensory sparing; cognition usually preserved	Majja-gata vata with sparing of sensory (Jnanavaha) srotas	Selective involvement of motor channels

Dosha: Vata, Pitta, Kapha; Avarana: occlusion of one dosha by another; Dhatu: body tissue; Srotas: channel.

4.2 Samprapti (pathogenesis) and treatment principles

In classical terms, Vata is aggravated by dry, light foods, excessive exertion, grief, trauma and ageing, and, when it lodges in Snayu (tendons and ligaments), Sira and Majja (marrow and nervous tissue), produces wasting, stiffness and loss of function [15–17]. Where Kapha obstructs Vata (Avarana), the principle is first to relieve the obstruction by Swedana and mild Shodhana, whereas in pure Dhatukshaya (tissue depletion) the principle is Brimhana (nourishment), Snehana and Basti. Figure 1 sets this sequence beside contemporary pathobiology. The analogies are interpretive and are offered as a heuristic for generating testable hypotheses, not as proof of equivalence.

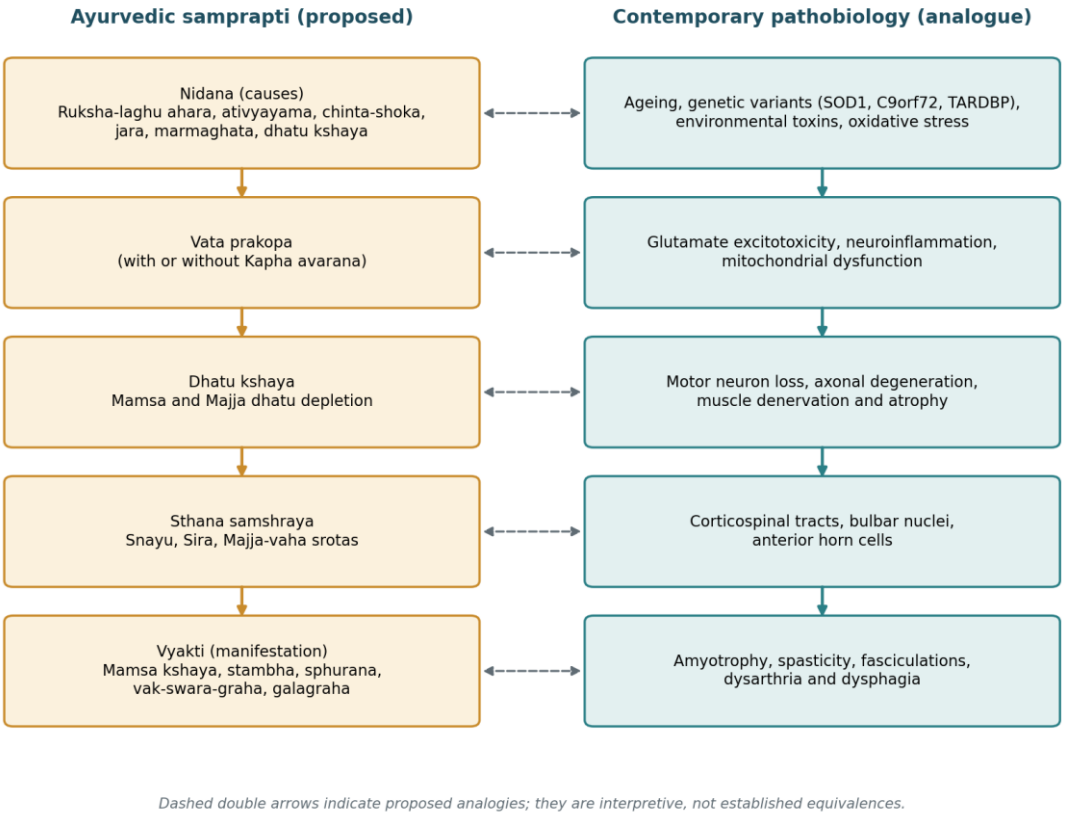


Figure 1. *Proposed Ayurvedic samprapti of ALS/MND (left) beside contemporary pathobiology (right). Dashed arrows denote interpretive analogies.*

5. Panchakarma and External Therapies

Panchakarma procedures are central in Kerala-style and institutional Ayurvedic care for neurological disease. The reported ALS cases used Swedana, Niruha basti, Virechana and Sarpipana for a Kaphavrita presentation [24], Shodhana followed by Rasayana for Dhatukshayajanya Ekangavata [5], and Basti with Nasya in a further case [25]. Table 2 lists the principal procedures with representative media, proposed actions and the cautions that apply in ALS, where respiratory and bulbar involvement alter the risk-benefit balance.

Table 2. Panchakarma and external therapies used in Vatavyadhi and relevant to ALS/MND.

Procedure	Medium / representative drugs	Proposed action	Cautions in ALS
Abhyanga (oil massage)	Ksheerabala, Bala-Ashwagandhadi, Mahanarayana, Dhanwantaram taila	Snehana of snayu and mamsa; Vatahara; improves circulation and tone	Gentle technique; avoid vigorous pressure over wasted limbs
Swedana: Shashtika shali pinda sweda (Njavara kizhi)	Navara/Shashtika rice cooked in Bala kashaya and cow's milk, applied in boluses	Brimhana sweda; nourishes muscle (Mamsa), reduces stiffness	Heat tolerance; monitor for fatigue and orthostatic changes
Swedana: Patra pinda sweda / Patra potali	Leaves of Eranda, Nirgundi, Arka, Nimba, Shigru with coconut, lemon and medicated oil	Vatahara, shothahara; relieves cramps and stiffness	Skin integrity; avoid in advanced dependent oedema
Pizhichil (Sarvanga Parisheka / Taila dhara)	Warm Ksheerabala, Dhanwantaram or Balaashwagandhadi taila, applied in streams with simultaneous massage	Snehana plus swedana; Vata pacification; relief of spasticity and pain	Needs trained team; fatigue; fall risk
Shirodhara / Shiropichu / Shirobasti	Ksheerabala, Brahmi taila, Dhanwantaram taila, Bala taila	Calms Prana vata; supports Majja; sleep and mood	Reclining position may worsen orthopnoea in respiratory involvement
Nasya (errhine therapy): Marsha / Pratimarsha	Anu taila, Ksheerabala 101 (Marsha); Ashwagandha-Bala siddha taila	Urdhvajatrugata vata, bulbar and facial Vata; nourishes Shiras	Aspiration risk in bulbar dysfunction; use small controlled volumes
Snehapana / Sarpipana (internal oleation)	Plain or medicated ghrita: Kalyanaka, Brahmi, Indukanta, Ashwagandha ghrita	Prepares for Shodhana; Brimhana; Vatahara; documented in the Kaphavrita Udana report [24]	Hyperlipidaemia, hepatic impairment; Ama signs
Virechana / Snehavirechana	Eranda taila, Gandharvahastadi kashaya, Trivrit-based formulations	Shodhana for Kaphavrita / Pittavrita conditions	Dehydration and electrolyte loss; avoid in advanced weakness and dysphagia
Anuvasana / Matra basti	Ksheerabala, Dhanwantaram, Bala taila (small dose, daily)	Principal Vatahara therapy; Pakvashaya as seat of Vata; Brimhana	Rectal comfort, continence; caregiver training
Niruha (Asthapana) basti	Dashamoola kashaya, Erandamuladi, Rasnadi and Mustadi (Yapana) yogas with honey, saindhava, taila	Vatahara, Brimhana, Balya; used after oleation	Dehydration, electrolyte disturbance; only in stable patients
Upanaha / Bandhana	Poultice of Vatahara herbs (Eranda, Rasna, Devadaru, Shatapushpa) with Amla dravya and taila	Local Vata relief in painful or stiff limbs	Skin reaction; avoid constriction
Mardana / Unmardana, Kati basti, Greeva basti	Medicated oils retained locally	Regional Vatahara; relief of back and neck pain	Adjunct only

Compositions are representative; practice varies between institutions. Procedures should be performed only by trained practitioners in coordination with the treating neurology team.

6. Kashayas (Decoctions) and Fermented Preparations

A kashaya (kwatha) is classically prepared by boiling one part of coarsely powdered drug in sixteen parts of water and reducing it to one-eighth of the volume, then filtering [26]. Kashayas are used orally, as the aqueous component of Niruha basti, as the medium for Shashtika pinda sweda, and as the adjuvant (anupana) for taila or bhasma. Arishtas and Asavas are fermented decoctions in which self-generated alcohol assists extraction. Table 3 lists the kashayas and fermented preparations most frequently cited for Vata disorders with paralysis, wasting and stiffness.

Three formulae merit comment. Dashamoola, the ten-root group, is the foundation of Vatahara practice and the commonest basis of Niruha basti [15,20]. Rasnasaptaka combines seven drugs, namely Rasna, Devadaru, Eranda, Aragvadha, Gokshura, Punarnava and Guduchi [18,21]. Maharasnadi, with roughly thirty-five drugs, contains Ashwagandha, Bala, Guduchi and Rasna, so it indirectly supplies *Withania somnifera* constituents, which are the best-studied Ayurvedic ingredients in ALS models [7,20,21]. Identity of Rasna differs among sources (*Pluchea lanceolata*, *Alpinia galanga* or *Vanda roxburghii*), a standardisation problem noted in Table 8.

Table 3. Kashayas and fermented preparations cited for paralytic and wasting Vata disorders (principal ingredients, abridged).

Formulation	Principal ingredients (abridged)	Traditional use cited	Source
Dashamoola kashaya	Bilva, Agnimantha, Shyonaka, Patala, Gambhari (Brihat pancha-moola); Shalaparni, Prishniparni, Brihati, Kantakari, Gokshura (Laghu pancha-moola)	Principal Vatahara; base for Niruha basti; swelling, pain	[15,20]
Rasnasaptaka kashaya	Rasna, Devadaru, Eranda, Aragvadha, Gokshura, Punarnava, Guduchi (seven equal parts)	Vata-kapha disorders; stiffness, pain, swelling	[18,21]
Maharasnadi kashaya	About 35 drugs, including Rasna, Dhanvayasa, Bala, Eranda moola, Devadaru, Shati, Vacha, Vasa, Shunthi, Haritaki, Chavya, Musta, Punarnava, Guduchi, Vriddhadaru, Shatapushpa, Gokshura, Ashwagandha, Prativisha, Aragvadha, Shatavari, Pippali	Pakshaghata, Kampavata, paralytic and degenerative Vata disorders	[20,21]
Dashamoola-Rasnadi kashaya	Dashamoola group plus Rasna, Eranda, Bala, Sahachara, Shatavari, Duralabha, Vasa, Guduchi, Devadaru, Ativisha, Musta, Shati, Shunthi	Inflammatory and Vata joint and neuromuscular disease (Kerala formulary)	[19,21]
Balaguduchyadi kashaya	Bala, Guduchi with other Vatahara and Balya drugs	Vata disorders with weakness (Kerala formulary)	[19]
Gandharvahastadi kashaya	Gandharvahasta (Eranda) as principal drug with Vatahara adjuncts	Mild purgation; Vata-anulomana before basti; Virechana support	[19]
Sahacharadi kashaya	Sahachara (*Strobilanthes ciliatus*), Devadaru, Shunthi and associates	Vatahara; neuromuscular pain, sciatica, paresis	[19]
Balarishta (fermented)	Bala, Ashwagandha with Madhu, Guda and Dhataki	Balya; Vata disorders with debility	[20]
Ashwagandharishta	Ashwagandha, Musali, Manjishtha, Haritaki, Haridra, Daruharidra, Yashtimadhu, Madhuka and others	Brimhana, Balya; neurological debility	[20]
Dashamularishta	Dashamoola with Guda, Madhu, Dhataki, Pushkaramoola, Chitraka and others	Vata disorders, Balya	[20]

Source codes refer to the references cited. Fermented preparations are included because they are widely co-administered; alcohol content should be considered in dysphagia and in patients on hepatotoxic drugs.

7. Medicated Oils (Taila) and Ghee (Ghrita)

Sneha kalpana, the preparation of medicated oils and ghee, uses a base of sesame oil or ghee cooked with a paste (kalka) of the drug and a liquid (drava) such as a kashaya or milk, in classical proportions, until the water is evaporated and characteristic signs of correct cooking appear [26]. The product is lipophilic, carries lipid-soluble constituents through the skin and mucosa, and is the vehicle for Abhyanga, Pizhichil, Shirodhara, Nasya and Basti. Avarti (repeated) processing, as in Ksheerabala taila 101 times, is said to intensify potency; analytical work on such preparations is still at a quality-standard stage [27].

Ksheerabala taila, a combination of Bala, cow's milk and sesame oil, is perhaps the single most widely used oil in Vata disorders, including Pakshaghata, Ardita and Kampavata, and is administered by Abhyanga, Shirodhara, Shiropichu, Nasya and Matra basti [19,27]. Ghee-based preparations such as Brahmi ghrita and Kalyanaka ghrita are used for Medhya and Rasayana purposes, and Sarpipana was part of the Kaphavrita protocol in one ALS case [24]. Table 4 lists the principal oils and ghee preparations.

Table 4. Medicated oils (taila) and ghee (ghrita) used in Vatavyadhi and relevant to ALS/MND.

Formulation	Principal ingredients	Routes of use	Rationale and remarks
Ksheerabala taila (and Avarti 101)	Bala (*Sida cordifolia* / *S. rhombifolia*), cow's milk, sesame oil; repeated processing (Avarti) in the 101 form	Abhyanga, Shirodhara, Shiropichu, Nasya, Matra basti; Avarti 101 internally under supervision	Classical Vatahara oil for Pakshaghata, Ardita, Kampavata [19,27]
Balaashwagandhadi taila	Bala, Ashwagandha, Ksheera, Tila taila	Abhyanga, Pizhichil, basti	Brimhana and Balya; muscle wasting, weakness
Mahanarayana taila	Dashamoola, Bala, Ashwagandha, Shatavari, Shatapushpa, Rasna and others in sesame oil and milk	Abhyanga, Pizhichil, Anuvasana basti	Pakshaghata, stiffness, Vata disorders [20]
Narayana taila	Ashwagandha, Bala, Dashamoola, Shatapushpa, Shatavari and aromatics in sesame oil	Abhyanga, basti, Nasya	Vata disorders; neuromuscular pain
Dhanwantaram taila (101)	Bala, Dashamoola, Yava, Kola, Kulattha, Devadaru, Rasna and others in Tila taila with milk	Abhyanga, Pizhichil, basti	Strengthens muscle; Vata disorders [19]
Sahacharadi taila	Sahachara-based decoction with Tila taila and milk	Abhyanga, Pizhichil, basti	Paresis, sciatica, Vata disorders
Prasarinyadi taila	Prasarini (*Merremia tridentata*) with Tila taila	Abhyanga, basti	Vata pacification; stiffness
Mashabaladi / Masha taila	Masha (*Vigna mungo*), Bala in Tila taila	Abhyanga, basti	Brimhana for muscle wasting; Pakshaghata
Anu taila	Jivaniya group, Chandana, Agaru, Bilva and aromatics in sesame oil with goat's milk	Nasya (Marsha)	Shirogata Vata; bulbar and cranial involvement
Brahmi ghrita	Brahmi, Vacha, Kushtha, Shankhapushpi in cow's ghee	Internal (Sarpipana), Nasya	Medhya; supports cognition and speech
Kalyanaka ghrita	Triphala, Haridra, Daruharidra, Manjishtha, Utpala, Vidanga and others in goat's or cow's ghee	Internal (Sarpipana)	Rasayana; neuropsychiatric and neurological use [19]
Indukanta ghrita	Dashamoola, Bala and associates in ghee	Internal	Vata disorders and debility; used in Kerala practice
Ashwagandha ghrita / taila	Ashwagandha kwatha and kalka in ghee or sesame oil	Internal or external	Brimhana, Balya; muscle wasting

Ingredient lists are abridged; consult the Ayurvedic Formulary of India and the Sahasrayogam for full formulae.

8. Bhasmas and Herbo-mineral Preparations

8.1 Preparation and chemistry

Bhasmas are calcined metal and mineral preparations produced by repeated purification (Shodhana), grinding with herbal juices or decoctions, shaping into pellets and incineration in sealed crucibles (Marana and Puta), often many times over. Classical end-point tests such as Varitara (floating on water), Rekhapurnatva (entering skin creases) and Nishchandratva (loss of lustre) imply very fine particle size and chemical conversion. Chemical characterisation reveals oxides and sulfides of the parent metal in a matrix of organic material and trace elements, with particles commonly in the sub-micron to

nanometre range [28,29]. The proposed advantages are enhanced bioavailability and reduced toxicity; however, composition varies markedly between batches and manufacturers, which makes safety assessment essential.

8.2 Preparations cited in Vatavyadhi

Table 5 lists the bhasmas and herbo-mineral formulations cited in Vata disorders. Swarna (gold), Rajata (silver) and Abhraka (mica) bhasmas are classed as Rasayana and Balya (strength-promoting), and are components of compound formulae such as Brihat Vata Chintamani rasa and Vasanta Kusumakara rasa [18,28]. No clinical study of any bhasma in ALS has been identified.

The only gold product tested in ALS in a randomised trial is CNM-Au8, a suspension of catalytically active gold nanocrystals; this is a modern nanomedicine and is not a bhasma. In the phase 2 RESCUE-ALS trial of 45 patients over 36 weeks, the primary electrophysiological endpoint was not met, but the open-label extension suggested slower progression and the product was well tolerated [30]. The result gives limited, indirect biological plausibility to the proposition that gold nanoparticles can be neuroactive, but it does not validate Swarna bhasma, whose particle size, surface chemistry and impurity profile differ.

8.3 Safety

Safety is the decisive consideration. Surveys of Ayurvedic products sold in the United States and India found lead, mercury and arsenic above accepted daily limits in a significant fraction of samples, notably among rasa-shastra preparations [10,31]. Lead exposure has been associated with ALS risk in a case-control study [11], and mercury is neurotoxic. For these reasons Naga bhasma, Rasasindura, Makaradhwaja and mercurial rasa formulations are not advisable in ALS, and any herbo-mineral product used should carry a batch-specific certificate of heavy-metal assay.

Table 5. Bhasmas and herbo-mineral preparations cited in Vata disorders, with chemistry and safety remarks.

Bhasma / preparation	Source	Principal phases reported	Classical claim	Safety remarks
Swarna bhasma	Gold (Swarna)	Metallic gold in nanoscale to micron particles	Rasayana, Medhya, Balya; Vata disorders [28]	Generally low toxicity when authentic; adulteration risk; clinical ALS data absent
Rajata bhasma	Silver (Rajata)	Silver, silver sulfide / oxide phases	Rasayana; neurological debility	Argyria with prolonged use; quality variable
Abhraka bhasma (Sahasraputi)	Biotite mica (Abhraka)	Aluminosilicates of Mg, Fe, K; iron oxide	Rasayana; neuromuscular weakness	Aluminium and trace-metal content must be tested
Loha bhasma / Mandura bhasma	Iron / iron rust (Loha, Mandura)	Fe_2O_3, Fe_3O_4	Balya, Rakta-vardhaka	Iron overload risk; unproven in ALS
Tamra bhasma	Copper (Tamra)	Copper oxide / sulfide	Vata-kapha disorders	Copper and zinc homeostasis is disturbed in ALS; avoid unsupervised use
Naga bhasma	Lead (Naga)	Lead oxide / sulfide	Vata disorders, Balya	Lead is neurotoxic and lead exposure has been associated with ALS risk [11]; not recommended
Vanga bhasma	Tin (Vanga)	Tin oxide (SnO_2)	Balya; Vata	Trace-metal contamination reported; use only if tested
Yashada bhasma	Zinc (Yashada)	Zinc oxide	Balya	Zinc excess impairs copper balance; caution
Pravala / Mukta / Shankha bhasma	Coral / pearl / conch shell	Calcium carbonate / calcium oxide	Balya, Brimhana	Low toxicity; supports calcium intake only
Rasasindura and Makaradhwaja	Processed mercury and sulfur (with gold in Makaradhwaja)	Mercuric sulfide (cinnabar-type) phases	Vatahara, Rasayana (Rasashastra)	Mercury is neurotoxic; contamination issues [10]; not recommended in ALS

Bhasma / preparation	Source	Principal phases reported	Classical claim	Safety remarks
Brihat Vata Chintamani rasa; Vasanta Kusumakara rasa; Yogendra rasa; Rasaraja rasa; Vata-gajankusha rasa	Herbo-mineral compounds (Swarna, Rajata, Abhraka, Loha, Pravala, Mukta, Rasasindura in varying combinations)	Mixed mineral and herbal matrix	Classical Vatavyadhi formulations (Pakshaghata, Majjagata vata) [18]	Contain processed mercury or heavy metals in several cases; no ALS data; use only if tested and under expert supervision
Yogaraja guggulu; Mahayogaraja guggulu; Rasnadi guggulu; Simhanada guggulu; Trayodashanga guggulu	Guggulu (*Commiphora wightii*) with Triphala, Trikatu and many herbs; Maha-yogaraja also includes mineral components	Resin matrix with herbal and mineral components	Vatavyadhi, stiffness, pain [20]	Mahayogaraja variant contains minerals; check composition; hepatic monitoring with riluzole

Principal phases are those typically reported for each class; actual composition varies with source material and process. Entries do not constitute therapeutic recommendations.

9. Rasayana, Medhya and Vatahara Herbs and Their Mechanistic Evidence

Rasayana drugs are intended to restore Dhatu quality and resist degeneration, and several have been examined for antioxidant, anti-inflammatory and neuroprotective effects [32]. Table 6 lists herbs relevant to MND, with constituents, proposed actions, ALS-specific evidence and cautions.

9.1 Withania somnifera (Ashwagandha)

Ashwagandha is the best-studied Ayurvedic drug in ALS models [33]. In TDP-43 A315T transgenic mice, a root extract reduced NF-κB activity and TDP-43 proteinopathy and improved motor performance [7]. In SOD1 G93A mice, the extract reduced glial activation and NF-κB phosphorylation and delayed disease progression [8]. The purified withanolide withaferin A lowered misfolded SOD1, attenuated neuro-inflammation, preserved motor neurons and delayed death in SOD1 G93A and G37R mice [9]. In an hSOD1 *Drosophila* model, a methanolic extract of *Withania somnifera* improved survival and climbing and reversed mitochondrial abnormalities [34], and in a TDP-43 fly model standardised extracts partly rescued locomotion and electrophysiology [35]. These findings are consistent but remain preclinical, and no randomised human ALS trial exists. Rare cases of liver injury have been reported [36], an issue that overlaps with the liver monitoring required for riluzole.

9.2 Mucuna pruriens (Kapikacchu or Atmagupta)

Mucuna pruriens seeds contain L-DOPA and have clinical and neuroprotective data in Parkinson's disease [37,38]. In the hSOD1 *Drosophila* model the extract improved climbing but, unlike Withania, did not improve survival [34], and in a TDP-43 model it partly rescued motor phenotypes [35]. The relevance to human ALS is unknown.

9.3 Curcuma longa (Haridra) and curcuminoids

Turmeric is both a culinary spice and an Ayurvedic drug. In a 12-month, double-blind, placebo-controlled pilot trial in 54 patients, nanocurcumin (80 mg/day) added to riluzole was associated with fewer events (death or ventilation dependence) than placebo (1/27 versus 6/27; survival curves $p = 0.036$), while other outcomes did not differ [6]. A separate randomised study with a 600 mg/day curcumin preparation found a stable ALSFRS-R in the group treated for six months, while the placebo-first group declined, together with improvements in oxidative-stress markers [39]. Both studies are small and require independent confirmation, and they test curcuminoid products rather than whole-turmeric Ayurvedic preparations.

9.4 Medhya herbs and others

Bacopa monnieri (Brahmi) has antioxidant, cholinergic and neuroprotective actions in preclinical work [40], and *Centella asiatica* (Mandukaparni) shows mitochondrial and antioxidant effects in neuronal models [41]. Neither has ALS-specific data. Bala (*Sida cordifolia*) is the base of Ksheerabala taila; it

contains ephedrine-type alkaloids and merits cardiovascular caution [27]. Vacha, Yashtimadhu and Shilajit have cautions listed in Table 6.

Table 6. Single herbs of the Rasayana, Medhya and Vatahara groups relevant to ALS/MND.

Herb (Sanskrit / botanical)	Key constituents	Proposed neuro-relevant action	Evidence relevant to ALS	Cautions
Ashwagandha (*Withania somnifera*)	Withanolides, withaferin A, withanone, alkaloids	NF-kB inhibition, anti-inflammatory, antioxidant, autophagy and clearance of TDP-43 / misfolded SOD1	Mouse (TDP-43 A315T, SOD1 G93A), *Drosophila* [7–9,34]; no human ALS trial	Rare liver injury [36]; thyroid effects; sedation
Atmagupta / Kapikacchu (*Mucuna pruriens*)	L-DOPA, flavonoids, alkaloids	Dopaminergic, antioxidant, neuroprotective	*Drosophila* hSOD1 and TDP-43 (motor benefit) [34,35]; Parkinson's disease clinical data [37,38]	Dyskinesia, psychosis, hypotension; interacts with levodopa and MAO inhibitors
Brahmi (*Bacopa monnieri*)	Bacosides, alkaloids	Antioxidant, anti-excitotoxic, cholinergic modulation	Preclinical neuropharmacology [40]; no ALS data	Gastrointestinal upset; bradycardia
Mandukaparni (*Centella asiatica*)	Asiaticoside, madecassoside, triterpenoids	Mitochondrial and antioxidant support, neurite growth	Preclinical neuroprotection [41]; no ALS data	Hepatotoxicity reports are rare; sedation
Haridra (*Curcuma longa*)	Curcuminoids	Anti-inflammatory, antioxidant, Nrf2 activation	Randomised trials in ALS: nanocurcumin add-on to riluzole (n = 54) and oral curcumin (600 mg/day) [6,39]	Poor bioavailability; gallstones; antiplatelet effect
Guduchi (*Tinospora cordifolia*)	Diterpenoid lactones, alkaloids, polysaccharides	Immunomodulatory, antioxidant	General Rasayana literature [32]; no ALS data	Hepatic injury reports with some products
Bala (*Sida cordifolia*)	Ephedrine-type alkaloids, phytosterols	Balya; Vatahara; neuroprotective effects reported in animals [27]	Traditional (Ksheerabala base); no ALS data	Ephedrine content: palpitations, hypertension
Shatavari (*Asparagus racemosus*)	Steroidal saponins (shatavarins)	Brimhana; antioxidant	General Rasayana literature [32]	Oestrogenic activity; fluid retention
Shankhapushpi (*Convolvulus pluricaulis*)	Alkaloids, flavonoids	Medhya; anxiolytic, antioxidant	Classical Medhya Rasayana [32]	Sedation
Jyotishmati (*Celastrus paniculatus*)	Sesquiterpene alkaloids, fatty oil	Medhya; antioxidant	Classical Medhya Rasayana [32]	Gastric irritation
Vacha (*Acorus calamus*)	Beta-asarone	Medhya; Vata-kapha	Classical use (Maharasnadi ingredient) [20]	Beta-asarone toxicity; limit to processed or low-asarone varieties
Yashtimadhu (*Glycyrrhiza glabra*)	Glycyrrhizin, flavonoids	Rasayana; Vatahara	Classical use [20]	Hypokalaemia, hypertension: can aggravate weakness
Eranda (*Ricinus communis*) root and oil	Ricinoleic acid (oil); alkaloids (root)	Vatahara; Virechana (oil)	Core ingredient in Rasnasaptaka and Maharasnadi [20]	Electrolyte and fluid loss with Virechana
Shilajit (mineral pitch)	Fulvic and humic acids, minerals	Rasayana; antioxidant	Classical Rasayana [28]	Heavy-metal and microbial contamination in poor-quality product

Evidence column: ALS-specific data only unless otherwise stated. Cautions are principal known risks and are not exhaustive.

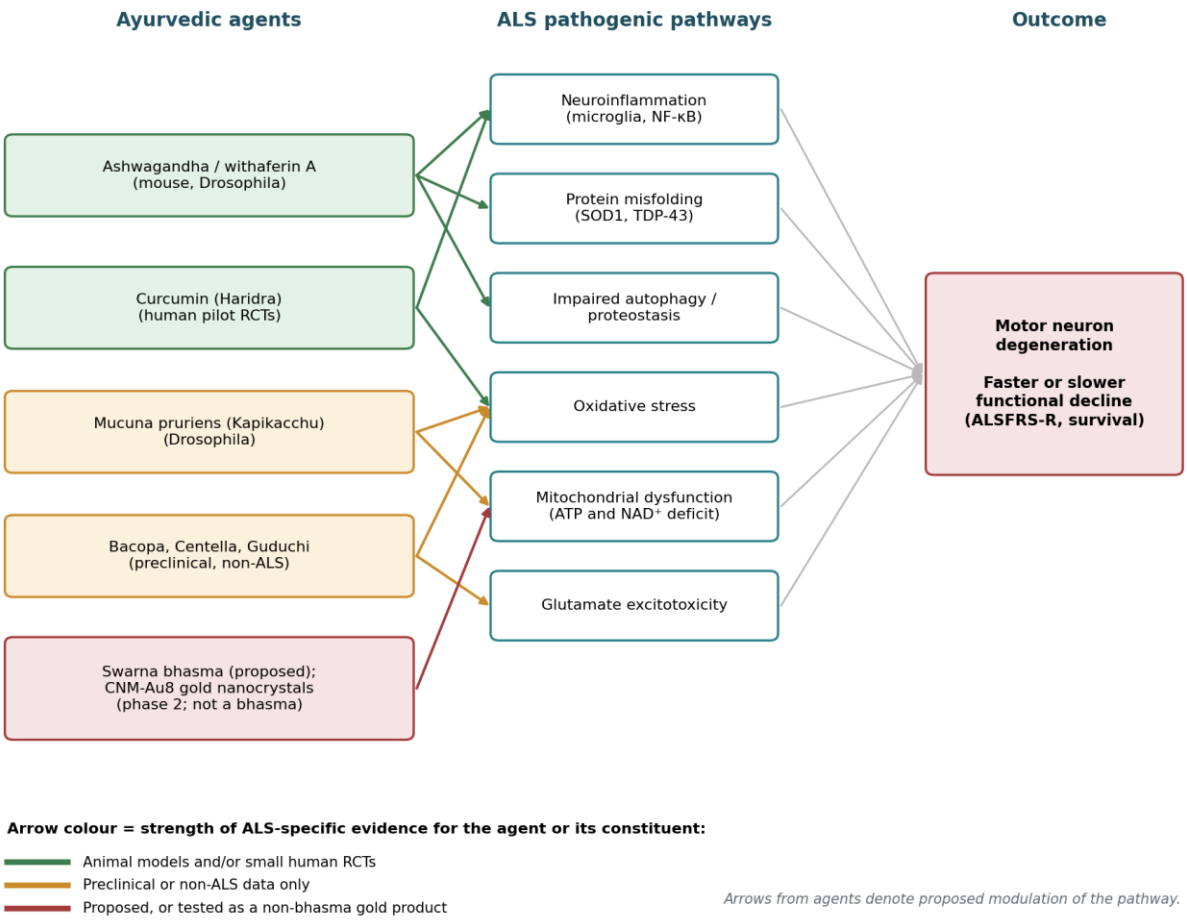


Figure 2. *Proposed mechanisms of Ayurvedic agents against pathogenic pathways in ALS. Arrow colour reflects the strength of ALS-specific evidence for the agent or its constituent; all linkages other than those from animal and early human studies are hypothetical.*

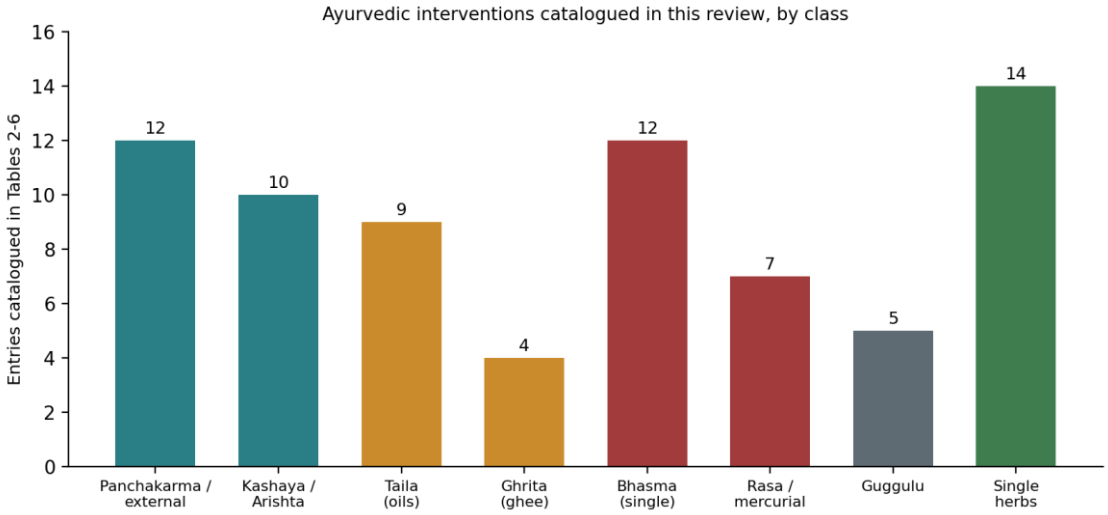


Figure 3. *Number of Ayurvedic interventions, by class, catalogued in Tables 2 to 6 of this review.*

10. Clinical and Preclinical Evidence

Table 7 collates the published evidence. The human Ayurvedic literature on ALS consists of isolated case reports. One, in a 75-year-old man, recorded an ALSFRS-R rise from 26 to 34 after Shodhana followed by Rasayana [5]; the ALSFRS-R is a validated 48-point scale with a maximum score of 48 that includes respiratory items [42]. Others document Panchakarma protocols without controls [24,25].

A report on Hirayama disease, a benign focal motor neuron disease, described arrest of progression after Nasya, Basti and Shamana drugs [43], but this condition has a different natural history from ALS and the finding cannot be extrapolated.

Such reports are vulnerable to selection and publication bias, to the natural variability of ALS progression in individual patients, to co-interventions such as physiotherapy, nutrition and prior pharmacotherapy, and to the unblinded assessment of subjective items. They are hypothesis-generating at best. The controlled evidence concerns constituents rather than formulations: nanocurcumin and curcumin [6,39] and, in a modern gold nanotherapeutic, CNM-Au8 [30]. Figure 4 plots the two quantitative observations that are publicly available, and Figure 5 positions the entire evidence base.

Table 7. Clinical and preclinical studies of Ayurvedic interventions or Ayurvedic-derived constituents in ALS/MND.

Study	Design and subjects	Intervention	Main findings (as reported)
Abhitha et al., 2022 [5]	Case study; 75-year-old man; ALSFRS-R 26 at baseline	Vatahara line of management with Shodhana, followed by Rasayana therapy; classified as Dhatukshayajanya Ekangavata	ALSFRS-R rose from 26 to 34 with improved speech, walking and appetite (single case; no control)
JAIM case report, 2022 [24]	Single patient; bilateral lower-limb weakness; EMG consistent with MND	Kaphavruta-Udanavata protocol: Swedana, Niruha basti, Virechana, Sarpipana with oral drugs; no other allopathic drugs during intervention	Single uncontrolled case; outcomes as given by the authors
Gusain and Srivastava [25]	Case study; 75-year-old man	Basti (medicated enema) and Nasya	Single uncontrolled case; authors note the diagnostic and management dilemma
Nandigoudar et al., 2021 [43]	Case; 27-year-old man with Hirayama disease (a benign focal motor neuron disease, not ALS)	Nasya, Basti, Shamana aushadhi	Arrest of progression and functional gain reported; not directly transferable to ALS
Dutta et al., 2017 [7]	TDP-43 A315T transgenic mice	*Withania somnifera* root extract (11:1)	Reduced TDP-43 pathology and NF-kB activity; improved motor performance
Dutta et al., 2018 [8]	SOD1 G93A mice	*Withania somnifera* extract	Reduced glial activation and NF-kB phosphorylation; improved motor performance; delayed progression
Patel et al., 2015 [9]	SOD1 G93A and SOD1 G37R mice	Withaferin A (purified withanolide)	Reduced misfolded SOD1 and neuroinflammation, fewer lost motor neurons, delayed disease and mortality
De Rose et al., 2017 [34]	hSOD1 *Drosophila* model	*Withania somnifera* (Wse) and *Mucuna pruriens* (Mpe) methanolic extracts	Wse but not Mpe improved survival; both improved climbing; mitochondrial changes reversed by Wse only
TDP-43 *Drosophila* study, 2018 [35]	TDP-43 *Drosophila* model	Standardised Mpe and Wse extracts	Anomalous locomotion and electrophysiology partly rescued
Ahmadi et al., 2018 [6]	Randomised, double-blind, placebo-controlled pilot; n = 54; 12 months; add-on to riluzole	Nanocurcumin 80 mg/day or placebo	Events (death or ventilation dependence): 1/27 versus 6/27; survival curves differed (p = 0.036); no other outcome differed
Chico et al., 2018 [39]	Randomised double-blind trial with open-label phase; oxidative-stress biomarkers	Curcumin 600 mg/day (Brainoil)	ALSFRS-R stable in the group treated for 6 months and fell in the placebo-first group; oxidative biomarkers improved; authors call for confirmation
Vucic et al., RESCUE-ALS [30]	Phase 2 randomised placebo-controlled trial; n = 45; 36 weeks	CNM-Au8 gold nanocrystals, 30 mg/day (not an Ayurvedic bhasma)	Primary MUNIX endpoint not met; open-label extension suggested slower progression; well tolerated

RCT, randomised controlled trial; ALSFRS-R, ALS Functional Rating Scale-Revised; MUNIX, motor unit number index.

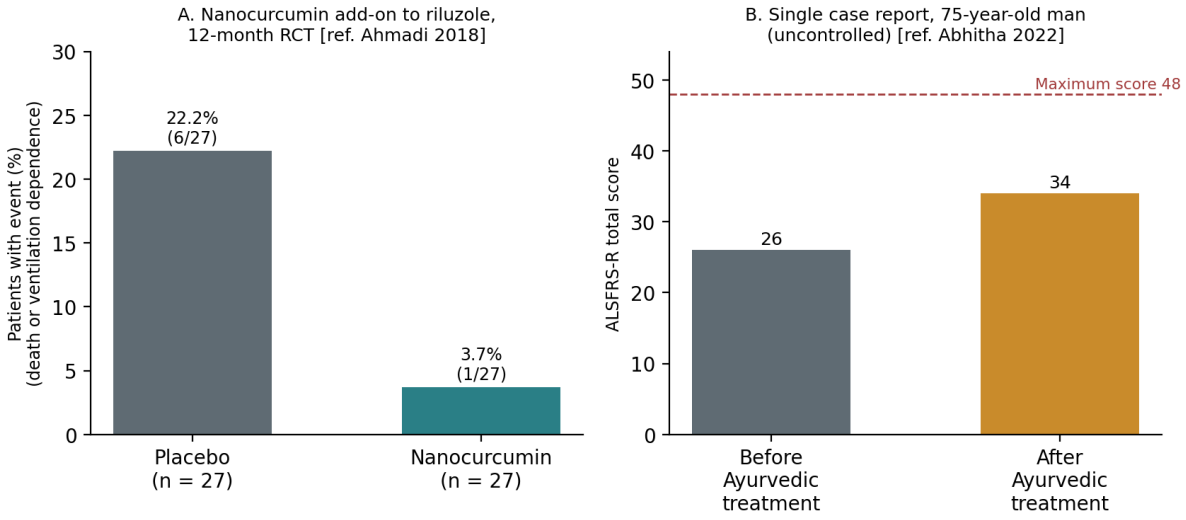


Figure 4. (A) *Proportion of patients with an event (death or ventilation dependence) in the 12-month nanocurcumin add-on trial* [6]. (B) *ALSFRS-R before and after Ayurvedic management in a single uncontrolled case* [5]; *interpretation is limited by the absence of a control*.

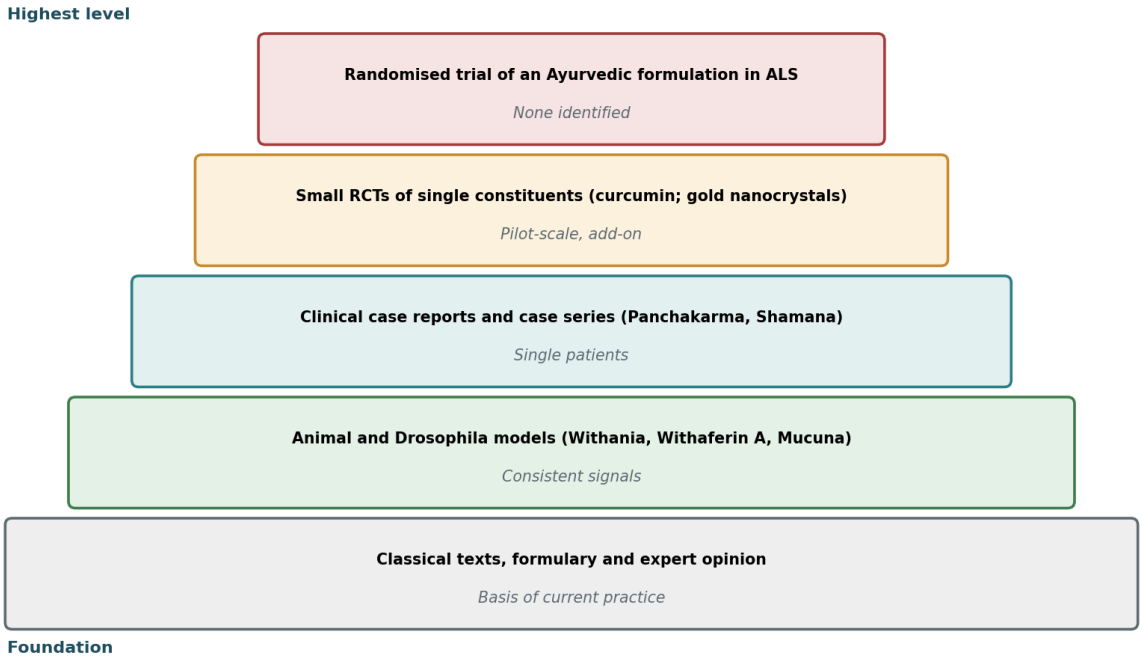


Figure 5. *Evidence hierarchy for Ayurvedic interventions in ALS/MND. No randomised trial of an Ayurvedic formulation in ALS has been identified.*

11. Safety, Quality Control and Interactions

The principal hazards are contamination, herb-specific toxicity and procedure-related risk in a medically fragile population. Table 8 summarises them with mitigations. Particular attention should be paid to metal exposure, to liver function when Ayurvedic herbs are co-administered with riluzole, and to the respiratory and swallowing status of the patient before any Nasya, Dhara therapy or purgative procedure is considered [3,10,36].

Table 8. Safety, quality-control and interaction issues for Ayurvedic management of ALS/MND.

Issue	Details	Mitigation
Heavy-metal contamination	Lead, mercury and arsenic were found above regulatory limits in a notable proportion of Ayurvedic products sampled in the United States and India [10,31]	Use only products with batch-wise assay for Pb, Hg, As, Cd; avoid unlabelled rasa-shastra products
Metal neurotoxicity in ALS	Lead exposure has been linked to ALS risk [11]; mercury and copper-zinc imbalance are of concern in motor neuron disease	Avoid Naga bhasma, Rasasindura and mercurial compounds; prefer herbal and oil-based forms
Hepatotoxicity	Ashwagandha-induced liver injury has been described [36]; riluzole itself requires liver-function monitoring [3]	Baseline and periodic liver function tests; stop with jaundice or raised enzymes
Herb-specific toxicity	Ephedrine in *Sida cordifolia*, beta-asarone in *Acorus calamus*, aconitine in unprocessed *Aconitum*, hypokalaemia with Glycyrrhiza	Standardised, processed raw material; dose limits
Panchakarma risks in ALS	Dehydration and electrolyte loss (Virechana, Niruha basti); aspiration during Nasya in bulbar disease; orthopnoea when lying flat for Dhara therapies; fatigue	Physician-led selection, hydration and respiratory monitoring; adapt posture and volume; avoid in advanced respiratory failure
Drug interactions	Mucuna with levodopa or MAO inhibitors; curcumin and Ayurvedic herbs with anticoagulants; additive sedation	Complete medication reconciliation; inform the treating neurologist
Standardisation	Plant identity varies by region (e.g. Rasna = *Pluchea lanceolata*, *Alpinia galanga* or *Vanda roxburghii*); batch variation	Authenticated raw drugs, chemical fingerprints, pharmacopoeial standards [20]

Mitigations are general principles and do not replace individual medical assessment.

12. A Conceptual Integrative Framework

Figure 6 presents a conceptual sequence, drawn from the case reports and the classical Vatavyadhi approach, in which Nidana-parivarjana and Snehana lead to selective Shodhana, then Shamana with kashayas, oils and ghee, and finally Rasayana and Brimhana [5,15,24]. It is framed as a hypothesis for pragmatic study within an integrative clinic, not as a validated protocol. Three principles follow from the evidence reviewed. First, conventional therapy (riluzole, edaravone where appropriate, non-invasive ventilation, nutritional and rehabilitative care) continues unchanged. Second, the choice and intensity of Ayurvedic procedures are individualised to respiratory and bulbar status, with Shodhana reserved for stable patients. Third, only products with certified heavy-metal assays are used, and mercurial and lead-containing preparations are excluded.

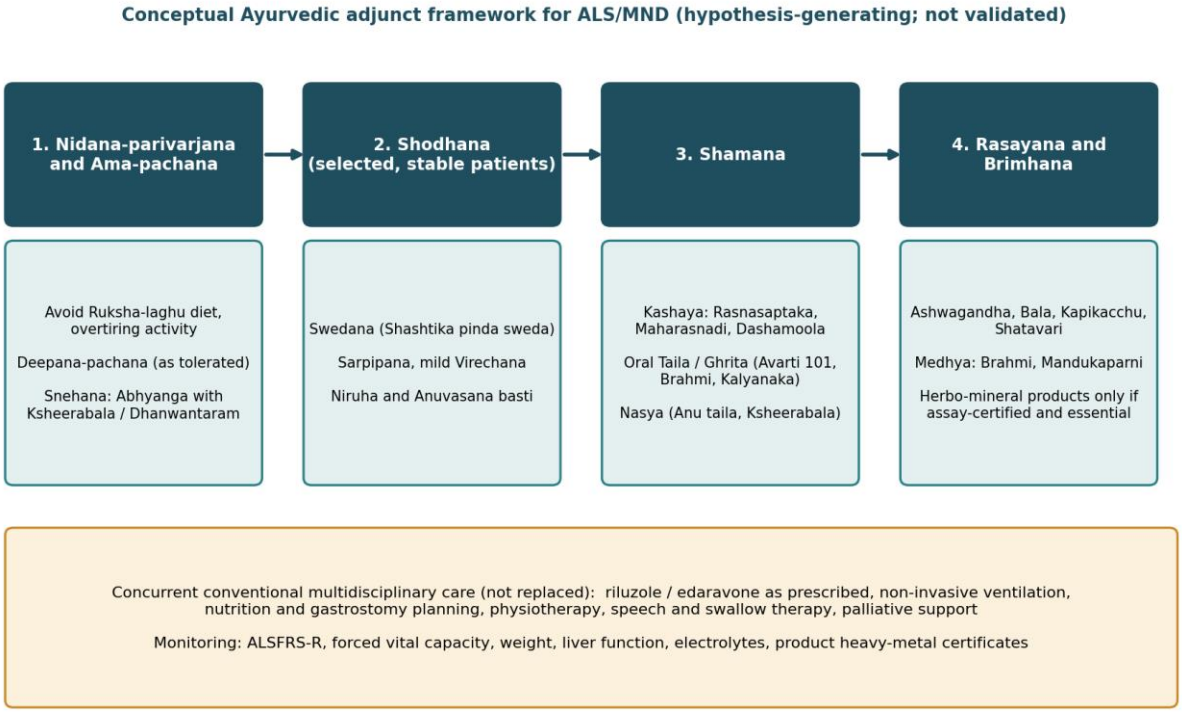


Figure 6. *Conceptual framework for adjunctive Ayurvedic care in ALS/MND alongside conventional multidisciplinary management. The sequence is hypothesis-generating and unvalidated.*

13. Research Gaps and Recommendations

- Pragmatic and N-of-1 trials of defined regimens (for example Ksheerabala taila with Maharasnadi kashaya), with ALSFRS-R, forced vital capacity, survival and plasma neurofilament as outcomes, and CARE and CONSORT-compliant reporting.
- Preclinical testing of classical whole formulations, not only isolated constituents, in SOD1 G93A and TDP-43 models and in patient-derived motor neurons.
- Chemical fingerprinting (HPLC or HPTLC of withanolides, curcuminoids, bacosides) and elemental analysis (ICP-MS) of every batch, with standardised botanical identification of contested drugs such as Rasna and Bala.
- Nanoscale characterisation of Swarna bhasma and other bhasmas (particle size, phase, surface chemistry), with pharmacokinetics and neurotoxicity studies before any clinical use in ALS.
- Systematic documentation of herb-drug interactions with riluzole and edaravone, including hepatic monitoring protocols.
- A multicentre registry of ALS patients receiving Ayurvedic care, recording regimen, adverse events and outcomes prospectively.

14. Conclusions

Ayurveda offers a comprehensive and internally coherent therapeutic repertoire for the wasting and paralytic syndromes classed as Vatavyadhi, and several of its constituents, notably *Withania somnifera* and curcuminoids, show biologically plausible activity in ALS models and small trials. The clinical evidence specific to ALS, however, is confined to single-patient reports, no classical formulation has been tested in a randomised trial, and some mineral preparations pose real neurotoxic risks. Ayurvedic therapies should therefore be regarded as unproven adjuncts for symptom care and quality of life, delivered with product safety verification and under physician supervision, until adequately powered, standardised studies demonstrate otherwise.

Declaration, Conflict of interest and funding

The content provided herein is developed using AI tools, and is meant to help Researchers who are working in the fields of Ayurveda medical sciences.

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Data availability: No new datasets were generated or analyzed.

Author Note

This manuscript is a narrative literature review and is not a treatment recommendation for any individual patient.

On classical formulations: Compositions given are abridged principal ingredients assembled from the formulary and product labels; they are for scholarly review and must not be used as preparation or prescribing instructions.

Ayurvedic preparations should be used only for a clinically justified indication and with appropriate medical monitoring under the supervision of an expert physician.

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