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Ayurvedic Management of Cerebral Palsy: A Conceptual Review

Kiran Vilasrao Joshi, Uganta Meena, V. K. Kori

Abstract

Cerebral Palsy (CP) one among the leading cause of disability in children, making them physically and mentally handicapped and socially apart are of great concern to the family as well as the society. Worldwide incidence is approximately 2.5 cases per 1000 live births. In India it was estimated around 3 cases per 1000 live births and has become quite familiar to both layman and medical communities due to high and stagnant prevalence since last many decades. There is no such effective treatment for the underlying brain damage formulated till date, presently physiotherapy is accepted as the standard management protocol by the majority of modern allopathy doctors and its action is limited to early stimulation and prevention of muscle contractures and disuse atrophy. Present paper aims to present the Ayurveda treatment modalities available for the management of the disease.

Keywords: Ayurvedic, Cerebral Palsy, handicapped and socially, CP

Introduction

Cerebral palsy (CP) is defined as a non-progressive neuromotor disorder of cerebral origin, but crippling neurological disorder in children. Motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication and behaviour. Cerebral palsy (CP) is one of the most common causes of disability in childhood, leading to functional limitations. It is characterized by the inability to normally control motor functions, which affect the child's ability to explore, speak, learn, and become independent. Effective management can improve the quality of life for the child and family. 'Cerebral' refers to the cerebrum, which is the affected area of the brain; 'palsy' refers to disorder of movement. An exact correlation to cerebral palsy is not directly available in the Ayurvedic texts. However, considering the Ayurvedic disease classification and their respective features, Cerebral palsy can be compared with *Vatavyadhi* or *Vatavikar* (diseases of the nervous system) which specifically afflict the *Shiro-marma* which may noticeable in various clinical forms as *Pakshaghat*, *Ekangaroga*, *Pangu*, *Sarvangroga*, *Aakshepka*, *Ekangaroga*, *Pangu*, *Sarvangroga*, *Aakshepka* etc. It is also worth mentioning that just like cerebral palsy, *Vatavyadhi* too may emerge at any age (before birth, during birth and after birth till old age) i.e. since conception up to old age.

Aushadha has the 2nd place among the *Chikitsa Chatushpaada* (four-fold factors).^[1] *Acharya Bhavaprakasha* defines drug as a substance, by which the physician cures the disease. According to *Charaka Samhita* there is no substance in the world, which cannot be used as a drug, when used rationally and with a definite objective (*Nanaausadhibhutama*). *Acharya Charaka* in *Sutrasthana* describes the qualities of ideal drug –having abundant supply (*Bahuta*), wide applicability (*Yojnyatva*), can be prepared in many forms and by different processes (*Anekavidha Kalpana*) and is dependable with valuable qualities (*Sampata*). Present paper aims to give the review of the ayurvedic management of the disease.

Materials and Methods

All the relevant texts of Ayurveda and contemporary texts were explored to compile the treatment modalities for cerebral palsy.

Results

Ayurveda has also given importance for considering the drug as a whole because; the action of whole drug is often different from that of its constituents when considered separately. WHO defines drug as, "any substance or product that is used or intended to be used to modify or explore physiological systems or pathological states for the benefit of the recipient."^[2] This definition appears more in compliance with the terms of Ayurveda, which aims at the preservation of good health apart from mitigation of disease.^[3] Management of Cerebral palsy can be categorised into drugs being used for internal administration and external administration. Churna Kalpana is more palatable for children along with Madhu at the same time it is easy for dose fixation. Procedures like Abhyanga, Anuvasana Basti, Udavartana etc can be used as external administration. By using the Panchendriyavivardhana Taila, Indriya become perspicuous, memory, intellect, body and strength also increases.^[4] So, Panchendriyavivardhana Taila can be used for Nasya. Yava and Kulattha powder can be used for Udavartana as this combination can be used for Rukshana and Srotoshodhana purpose. Sahachara Taila can be used for Abhyanga and Anuvasana Basti due to easy availability, cost effectiveness and high medicinal values. Madhutailika Basti can be used for Aasthapana following the classical reference. The contents are Madhu, Saindhava, Taila, Madanaphala, Shatapushpa and Erandamula Kwatha.

1. Brahmi^[5] - Bhavaprakash Nighantu – (Guduchyadivarga)

Latin name	Bacopa moneri Linn.
Family	Umbelliferae
Gana	Charaka: Tiktakanda, Prajasthapana, Vayasthapana, Balya Sushruta : Tiktavarga
Part used	Panchanga (entire plant)
Vernacular names	English: Indian Pennywort Hindi- Vangsaag, Brahmi Gujarati- Khandi brahmi
Synonyms	Mandukaparni, Manduki, Brahmi, Saraswati Rasapanchaka
Rasa	Tikta, Kashaya, Madhura
Guna	Laghu, Sara
Virya	Sheeta
Vipaka	Madhura
Doshagnata	Kaphavatashamaka
Karma	Aayushya, Rasayani, Svarya, Smritiprada.

Prabhava Medhya

Adulterants/Substitutes –Mandukaparni (Centelasia asiatica Linn.Urban) is used as substitute and adulterant to Brahmi.^[6]

Chemical constituents: Bacosides A and B, Stigmasterol, Sapogenins and Flavonoids. Other compounds include triterpenoid saponins and other alkaloids (nitrogen-based organic substances), such as brahmine and herpestine. Bacopa also contains mannitol, betulic acid, beta-sitosterol, octacosane, nicotine, and amino acids such as alpha-alanine, aspartic acid, glutamic acid, and serine 10 & 11.

Major Therapeutic Claims- Intellect promoting and jaundice^[7]

Pharmacological Activities: Learning and Memory, Anticonvulsive, Anti asthmatic, Antidepressant, Anti-inflammatory, Antioxidant, Anti spasmodic, Anxiolytic effect, Gastroprotective, Hepatoprotective.

Action and Uses: Rao Appa et al have reported that significant increase in the general mental ability of mentally retarded children after 3 months and 6 months of drug Brahmi administration was found. In the behavioral area, significant improvement was found in the overall general adjustment and attention and concentration after 6 months.^[8]

Side Effects- Common side effects include increased bowel movements, stomach cramps, nausea, dry mouth and fatigue. **Lung conditions-** Bacopa might increase fluid secretions in the lung. There is concern that this could worsen lung conditions such as Asthma or emphysema.^[9]

2. Vacha^[10] - Bhavaprakash Nighantu (Haritakyadivarga).

Latin name	Acorus calamus Linn.
Family	Araceae
Gana	Charaka: Virechana, Lekhaniya, Arshoghna, Truptighana, Sheetaprashmana, Asthapanopaga, Shirovirechana, Sanjnasthapana, Sheetaprashmana. Sushruta: Pippalyadi, Vachadi, Mustadi. Vagbhata: Mustadi, Vachadi, Haridradi, Chhardana, Niruhana.
Part used	Rhizome.
Vernacular names	Hindi- Bacha, Ghorbacha. English- Sweet flag Gujarati- Godava
Synonyms	Uragandha, Shadhagrantha, Golomi, Shataparvika. Rasapanchaka
Rasa	Katu, Tikta.
Guna	Laghu, Teekshna, Sara.
Virya	Ushana.
Vipaka	Katu.
Doshagnata	Kaphavatashamaka.
Karma	Shamaka, Vedanasthapana, Anulomaka, Shulaghna, Deepana, Pachana, Jwaraghna, Swedajanana, Arshoghna. Used in Apasmara, Vibandha, Unmada, Smriti daurbalya.

Chemical constituents: Major constituents are saponin (medacoside, asiaticoside, medacassoside, asiatic acid, a new triterpenic aci.^[11] Active chemical principles are α -asarone, elemicine, cis-isoelemicine, cis and trans isoeugenol and their methyl ethers, camphene, P-cymene, b-gurjunene, a-selinene, b-cadinene, camphor, terpinen-4-ol, a-terpineol and a-calacorene, acorone, acronone, acoragermacrone, 2-deca-4,7 dienol, shyobunones, linalool and preisocalamendiol. Acoradin, galangin, 2, 4, 5-trimethoxy benzaldehyde, 2, 5-dimethoxybenzoquinone, calamendiol, spathulenol and sitosterol are also present

Pharmacological Activities- Anticonvulsant, anti-hyperlipidemic, antiulcer, cytoprotective activity, antispasmodic, analgesic, antibacterial.^[12] It increases the speaking ability or improves speech. It acts on behaviour besides being neuroprotectives.^[13] Having hepatoprotective, antioxidant, antimutagenic, sedative and hypothermic effects. Good in clearing speech to the

children^[14] and useful in schizophrenic psychosis.

Side effects- It can be used in very minute quantities in children. Because of its hot effect, some children may find it difficult to tolerate.^[15] Although, a few earlier reports have shown that ethanolic extract of Vacha rhizome can possess immunosuppressive, moderately hypotensive and respiratory depressant properties, no serious health hazards are known with the administration of designed therapeutic dose.^[16]

3. Shankhpushpi^[17] - Bhavaprakash Nighantu (Guduchyadi Varga).

Latin name	Convolvulus pluricaulis Chois.
Family	Convolvulaceae.
Gana / Classification	Sushruta- Tiktavarga
Part used	Panchanga (entire plant)
Vernacular names	English- Bind weed Hindi- Shankhahuli Gujarati- Shankhaval
Synonyms	Mangalyakusuma, Ksheerpushpi Rasapanchaka
Rasa	Tikta
Guna	Snigdha, Pichchhila
Virya	Sheeta
Vipaka	Madhura
Doshagnata	Kaphapittahara
Karma	Medhya, Rasayana, Kasajita, Chhardihara, Vrishya, Manasarogahrut, Balada, Agnida, Kantida.
Prabhava	Medhya

Adulterants/Substitutes- In certain parts of India, Clitoria ternate Linn., Evolvulus alsinoides Linn. And Canscora desussata Roxb. are used as substitute.^[18]

Chemical constituent: Major- Scopoletin, Kaempferol, Kaempferol-3-glucoside, 3, 4-dihydroxycinnamic acid. **Other-** Sankhpushpine, B-sitosterol, Are-coline, Convolvine. The constituent convolvine is responsible for blocking M2 and M4 cholinergic muscarinic receptors.^[19] Important chemical principles are microphylllic acid, shankhpushpin, kaempferol-kaempferol-3-glucoside, 3-4 dihydroxycinnamic acid, sitosterols. Neuroprotective and intellect promoting activity implicated to free radical scavenging and antioxidant property.

Major Therapeutic claims- Anti ulcerogenic, Memory enhancer.

Pharmacological Activity- It is useful in the insomnia, anxiety. It has mild diuretic action so it is used in relieving fluid retention. It is used in treating migraine and tension headache. Leaves are used in treating asthma and bronchitis.^[20]

4. Yashtimadhu^[21] - Bhavaprakash Nighantu (Haritakyadivarga).

Latin name	Glycyrrhiza glabra Linn.
Family	Fabaceae
Gana / Classification:	Charaka: Kanthya, Jeevaniya, Sandhaniya, Varnya, Kandughna, Mutraviranjaniya, Shonitasthapana. Sushruta: Kakolyadi, Sarivadi, Anjanadi.

Part used	Root
Vernacular names	English- Liquorice Hindi- Jethimadhu, Mulethi Gujarati- Jethimadh
Synonyms	Madhuka, Kleetaka, Atimadhura Rasapanchaka
Rasa	Madhura
Guna	Guru, Snigdha
Virya	Sheeta
Vipaka	Madhura
Doshagnata	Vatapittashamaka
Karma	Balya, Chakshushya, Vrishya, Varnya, Vatapittajit, Raktaprasadana, Vamanopaga, Asthapanopaga, Chhardighna, Shonitasthapana.

Adulterants/Substitutes- Roots of Abrus precatorius Linn. (Family Fabaceae) are used as adulterants of Mulhatti or genuine liquorice.^[22]

Chemical constituents: Major- Glycyrrhizin, glycyrrhizic acid **Other-** Lycorice, Isoliquiritin, Asparagine, Glabarin A and B, isoglabrolide, Dexoglabrolide, glycyrrhetol, liquoric liquoritic, glyzarine, 11-deoxy-glycyrrhetic. Glycyrrhizine, flavonones, isoflavones, glycyrrhetic acid, six phenolic compounds.^[23]

Major Therapeutic claims- Union promoting, vitaliser, beneficial for throat and complexion promoting.^[24]

Pharmacological Activity: Good for eyesight /vision, provides good strength and immunity, hair tonic, improves voice, heals ulcer, wounds, good expectorant, anti allergic, antidepressant, good brain tonic, anti pyretic.^[25] It increases the circulation into the CNS system and balances the sugar levels in the blood.^[26] Liquorice has significant action on memory enhancing activity in dementia; it significantly improved learning and memory on scopolamine induced dementia.

Side Effects- Consuming licorice daily for several weeks or longer can cause severe side effects including high blood pressure, low potassium level, cytotoxic, pseudoaldosteronism^[27], weakness, paralysis and sometimes brain damage in otherwise healthy people. Other side effects of licorice include tiredness, headache, and water and sodium retention. **Special Precaution-** Licorice can cause the level of potassium in blood. This can make hypertonemia worse. If potassium is already low, licorice might make it too low.^[28]

5. Guduchi^[29] - Bhavaprakash Nighantu (Guduchyadivarga).

Latin name	Tinospora cordifolia (Willd) Miers.
Family	Menispermaceae
Gana / Classification:	Charaka: Vayasthapana, Dahaprashamana, Trishnanigrahana, Triptighna, Stanyashodhana, Socrata: Guduchyadi, Patoladi, Aragvadhadi, Kakolyadi, Valli Pancha Moola Kaiyadeva Nighantu: Aushadha Varga (Included in Chaturbhadrha which contains Ativisha, Shunthi, Musta, Guduchi)
Part used	Kanda (stem)
Vernacular	English- Tinospora

names	Hindi - Giloy Gujarati – Galo
Synonyms	Madhuparni, Amruta, Varshabh, Chhinnaruha, Tantrika, Vatsadani, Kundalani, Chakralakshanika.
Rasa	Rasapanchaka Tikta, Kashaya.
Guna	Laghu
Virya	Ushna
Vipaka	Madhura
Doshagnata	Tridoshagnata
Karma	Balya, Deepana, Rasayana, Sangrahi, Vayasthapana, Raktashodhaka, Jvaraghna, Daha Prashamana, Triptighna, Stanyashodhaka.

Adulterants / Substitute - *Tinospora malabarica* (Lamk.) Hook f. & Thoms. is a substitute for *T.cordifolia*.^[30]

Chemical constituents: **Alkaloids**- alkaloids, diterpenoid lactones, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides. Berberine, giloin, choline, tinosporine, palmetine, magnoflorine. **Glycosides**- 18-norclerodane glucoside, fluranoid diterpene glucoside, tinocordiside, cordioside, aposylglycoside, pregnane glycoside, palmatoside. **Steroids**- Beta sitosterol, Delta setosterol, 20 Beta hydroxyecdysone, Ecdysterone, Giloinsterol, Tinocordifoline. The major constituent of Guduchi is berberine which exhibits a peculiar action. It is isoquinolone alkaloid that has AChE (acetylcholinesterase inhibitory) action; similarly, it is MAO – inhibitory. Berberine helps prevent oxidation damage to bio molecules of brain.

Therapeutic Category- Immunomodulator, hepatoprotective^[31]

Pharmacological Actions- Used in Jvara, Kushtha, Pandu, Prameha, Vatarakta, Kamala. Neuroprotective and ameliorative properties are due to their antioxidant and trace element contents.^[32] Rich source of trace elements (Zinc and Copper) which act as antioxidants and protects cells from the damaging effects of oxygen radicals generated during immune activation. It increases the blood profile and has leded scavenging activity. Possess learning and memory enhancing, antioxidant, and anti-stress activity. Enhanced the cognition in normal and cognition deficits animals in behavioural test Hebb William maze and the passive avoidance task. Mechanism of cognitive enhancement is by immunostimulation and increasing the synthesis of acetylcholine, this supplementation of choline enhances the cognition.^[33] Myriad actions of Guduchi may be attributed to its antioxidant and immunomodulatory properties.

6. **Pippali**^[34] - Bhavaprakash Nighantu (Haritakyadivarga).

Latin name	<i>Piper longum Radix</i>
Family	Piperaceae
Gana / Classification:	Charaka: Deepaniya, Kanthya, Asthapanopaga, Shirovirechanopaga, Sheeta-Prashamana, Shula-Prashamana, Kasahara, Hikkanigrahana, Triptighna, Vamana Socrata: Pippalyadi, Urdhvabhagahara, Tryushna, Amalakyadi, Sirovirechana

	Vagbhata: Pippalyadi (A.S)
Part used	Phala (fruit)
Vernacular names	English – Indian long Pepper Gujrati -Gantoda, Ganthoda Hindi – Pipal, Pipali, Pipli, Lendi, Peepar
Synonyms	Magadhee, Krushna, Vaidehi, Chapala, Kana, Upakulya, Ushana, Shaundi, Kola, Teekshnatandula. Rasapanchaka
Rasa	Katu
Guna	Laghu, Snigdha
Virya	Anushna
Vipaka	Madhura
Doshagnata	Vata-Kaphahara
Karma	Deepana, Pachana, Triptighna, Shulaprashamana, Krimighna, Vatanulomana.

Adulterants/Substitutes- *Piper sylvaticum* Roxb. Is substituted for *P. longum* in West Bengal

Chemical Constituents: **Major**- Alkaloids (Piperine, Piperlongumine, Piperlonguminine etc), methyl-3-4-5-trimethoxycinnamate. **Others**- Sesamin, L- aspartic acid, Essential Oils consisting of n-hexadecane, n-heptadecane, n-octadecane, n-nonadecane, n-cicosane etc., B- sitosterol, cepharadiones.^[35]

Therapeutic Category- Bioavailability enhancer^[36]

Pharmacological Actions- Piperacine was shown to enhance the bioavailability of Anti tubercular drugs rifampicin, pyrazinamide, isoniazid and ethambutol and also the anti-leprotic drug Dapsone.^[37] The essential oils of fruit showed anti-bacterial, anti-fungal and antihelmenthic properties.^[38] Ethanol extraction of *P.longum* fruits yields a known piperidine and piperine alkaloid, as a monoamine oxidase inhibitor. Thus, the piper longum fruits represent a promising pharmacotherapeutic candidate against depression^[39]

Side effects – People with Pitta imbalance will find it hard to tolerate this spicy root. It may cause or worsen the gastritis, burning sensation in stomach, throat, palm and feet.^[40]

DRUGS FOR UDVARTANA: Yava and Kulattha.

1. Yava^[41]

Latin name	<i>Hordeum Vulgare</i>
Family	Graminae
Gana	Bhava Prakash Nighantu, Kaiydev Nighantu - Dhanya Varga,
Part used	Fruit
Vernacular names	English – Barley Gujrati - Jau, Java, Jau Hindi - Yay, Jav, Jau
Synonyms	Divya Rasapanchaka
Rasa	Madhura, Kashaya
Guna	Ruksha, Mrudu
Virya	Sheeta
Vipaka	Madhura
Doshagnata	Kapha Pitta Shamaka
Karma	Balya, Lekhana, Vrushya, Sthairyakara,

Purishakruta properties.

Chemical constituents: The fruit contains Cyanogenic glycoside, characterized as 2 β –D Glucopyranosyloxy 3 Methyl (2R) Butyronitrile phosphones and iron Hordenine, Pyrolidine and Luteolin etc.

Action and usages: The seeds are Astringent, Demulcent, Emollient, Diuretic, Aphrodisiac, Digestive and tonic.

2. Kulattha^[42]

Latin name	Dolichos biflorus Linn.
Family	Fabaceae (Papilionaceae)
Gana / Classification	Charaka- Swedopaga Bhava Prakash Nighantu, Kaiydev Nighantu- Dhanya Varga, Raja Nighantu- Shalyadi Varga, Paripatadi Varga
Part used	Seeds
Vernacular names	Hindi - Kulathi, Kulthi; Kurathi Gujrati - Kalathi English – Horsegram
Synonyms	Kulattha, Kulali, Drkprasada, Lochanahita, Chakshushya, Kumbhakarika Rasapanchaka
Rasa	Kashaya, Madhura
Guna	Laghu, Teekshna, Ushna
Virya	Ushna
Vipaka	Katu
Doshagnata	Vata Kapha Shamaka
Karma	Mutrala-ashmaribhedana, Kasaghna- Kaphahara, Chaksushya, Hikkanigrahana, Sulaprashamana, Arshoghna, Dahaprashamana, Medohara, Hridya, Ruchikara
Collectionsite	Grain market, Jamnagar

Chemical Composition: Seeds contain protein (22. SVOalluminoides), starch 5.2%, oil 2% ash 3.2%, phosphoric acid 1%, fibrous tissue and urease in plenty.

Drugs for Abhyanga:

Tila Taila:

Tila taila is oil processed by extracted from the seeds of Tila.

Latin name – Sesamum indicum Linn.

Family – Pedaliaceae

Rasapanchaka

Rasa – Madhura

Anurasa – Tikta, Kashaya

Guna – Tikshna, Vyavayi, Sukshma, Ushna, Vishada, Guru, Sara, Vikasi

Virya – Ushna

Vipaka – Madhura

Doshagnata – Vatakaphahara

Karma – Brimhana, Prinana, Vrishya, Twaka Prasadana, Mardavakara

Sthairyakara, Balya, Garbhasaya Shodhaka, Bhagna Sandhanakara, Medhavardhaka, Keshya, Shulaprashamana, Ropaka.

Rogagnata – Vatavyadhi, Bhagna, Yoni-Karna-Shiroroga, Keshapata, Vrana.

Contents of Aasthapana Basti

Here in this study Madhutailika Basti is taken as Aasthapana Basti. The individual ingredients of Madhutailika Basti are explained in brief, relevant to the topic below:

1. Kwatha Dravya- Erandamula^[43]

Latin name	Ricinus communis Linn.
Family	Euphorbiaceae
Gana / Classification	Charaka- Bhedaniya, Angamardaprashamana, Swedopaga Sushruta- Vidarigandhadi, Adhobhagahara, Vatasanshamana
Part used	Root
Vernacular names	English- Castor oil plant Hindi- Eranda, Randi
Synonyms	Ananda, Chitra, Gandharavahastaka, Panchangula, Taruna, Urubuka Rasapanchaka
Rasa	Madhura
Guna	Snigdha, Tikshna, Sukshma.
Virya	Ushna
Vipaka	Madhura
Doshagnata	Kaphavata Shamaka

Chemical composition: Root and Root bark contains inorganic materials like potassium, sodium magnesium, chloride, nitrate, iron, aluminium, manganese, calcium carbonate and calcium phosphate. Gallotanins were also detected. The root shows presence of phenolic constituents. Powder mixed with water shaken and left to stand for sometimes, yields in colour and turn dark on heating. The powder does not froth when mixed with water indicating the absence of saponin.

Pharmacological Actions: Acharya Charaka has described Erandamoola as best Vrushyavatahara drug (Cha.Su.25).

The drug possesses Dipana (carminative), Aamashodhana (removal of toxins), Vedanasthapana (analgesic), Shothahara (anti-inflammatory) and Balya (strengthening) properties. The drug has been indicated in Shoola (pain), Shotha (inflammation), Katishula (Lumbago), Bastipeeda (urinary colic), Udara (ascitis) and Jwara (pyrexia). It is used in Bradhna (hernia), Shwasa (asthma), Anaha (abdominal distension) and Amavata (Rheumatic disorders). The drug possesses site of action mainly in Apanakshetra (perineum) and relieves Vibandha (constipation).

1. Madhu (Honey)

Latin name	Mal depuratum
Gana / Classification	Ashtanga Hridaya- Drava Dravya, Madhu Varga Madanapala Nighantu- Ikshukadi Varga Kaiyadeva Nighantu- Aushadhivarga
Vernacular names	English- Honey
Synonyms	Pushparasa, Pushpasava, Makshika, Kshudra, Varati, Saradha. Rasapanchaka

Rasa	Madhura, Kashaya
Guna	Ruksha
Virya	Sheeta
Vipaka	Katu
Doshagnata	Vata-Pittahara

Adulteration of Honey- Generally adulterated with cane sugar, corn sugar and commercial invert sugar.

Chemical composition: Honey is a viscid fluid as sweet as sucrose. Its specific gravity is 1.359-1.361. It contains moisture 14-24%, dextrose 23-26%, levulose 30-40%, sucrose 0.4-0.6%, Dextrine and gums-0.7%, ash 0.182-1% and miscellaneous-acid, pollen grains, beeswax, pigments etc 0.1-7%. It contains Vit. B1, B2, B6, Vit. C and nicotinic acid in trace amount. It also contains some minerals potassium, calcium, magnesium, zinc, iron, copper, phosphorus, sulphur, chloride, traces of chloride, traces of chromium, nickel, tin, silver and gold etc.

Pharmacological Actions: Honey is an excellent Yogavahi^[44] due to Nanadravyatmakata (formation from multiple Dravya). The presence of Madhu in Basti makes it more potent. It also possesses pharmacological actions like Deepana (carminative) Balya (strengthening), Varnya (enhance complexion and Shodhana). It is laxative, demulcent and emollient. The fatty acids present in the honey stimulate peristalsis and digestion. It decreases flatulence and increase general metabolism. It pervades to microchannels due to its Sukshma (minuteness) property. According to Sushruta, Madhu is Tridoshagna.^[45]

2. Saindhava (Rock salt)

Chemicalname	Sodium chloride (NaCl)
Vernacular names	English- Himalayan Salt Hindi name- Sendha Namak Gujartai- Sindhalun
Synonyms	Saindhava, Sheetashiva, Sindhuja, Nadeya, Manimantha Rasapanchaka
Rasa	Lavana, Madhura
Guna	Snighda, Teekshna
Virya	Sheeta
Vipaka	Madhura
Doshagnata	Tridosahara

Chemical composition: Sodium chloride is the major ingredient making upto 98%. It contains many useful minerals and elements. It also contains iodine, Lithium, Magnesium, Phosphorus, Potassium, Chromium, Maganese, Iron, Zinc, Stronium etc.^[46]

Pharmacological Actions: It has got Deepana, Pachana, and Vrishya properties. In small doses it is highly carminative and digestive. Saindhava plays the role of carrier and helps to act Basti in deep level and it also causes the return of Basti Dravya at the proper time.

3. Kalka Dravya

i. Shatapushpa^[47]

Latin name	Anethum sowa Roxb.
Family	Umbelliferae

Gana Classification	Charaka- Asthapanopaga
Part used	Fruit
Vernacular names	English- Indian Dill Hindi- Sova
Synonyms	Shatahva, Madhura, Karavi, Misi, Atilambi, Sitachatra, Samhitachatrika Rasapanchaka
Rasa	Katu, Tikta
Guna	Laghu, Tikshna
Virya	Ushna
Vipaka	Katu
Doshagnata	Vatashamaka

Chemical Composition: Dried fruit contains 3-4% volatile oil and fixed oil. Volatile oil contains anethine, phellandrone and d-limonene and piol.

Pharmacological Actions: The authors of Nighanturatnakara, Raja Nighantu and Kaiyadeva Nighantu etc. highlighted the specific usage of Shatapushpa in Bastikarma. It is Deepana (carminative) Pachana (digestive) and Anulomana. It is also Vedanasthapanana and Shothahara. It is explained as a psychotropic drug.

ii. Madanaphala^[48]

Latin name	Randia dumetorum
Family	Euphorbiaceae
Gana Classification	Charaka- Asthapanopaga, Anuvasanopaga Sushruta- Aragwadhadi, Mushkakadi
Part used	Fruit
Vernacular names	English- Emetic nut Hindi- Mainphala
Synonyms	Madana, Basti Shodhana, Dhara Phala, Granthiphala, Kantaki, Muchukunda, Chhardanah, Vamaka, Pindi, Maruvakah, Salyah. Rasapanchaka
Rasa	Madhura, Tikta
Guna	Ruksha, Laghu
Virya	Ushna
Vipaka	Katu
Doshagnata	Kaphahara

Chemical Constituents: Moisture 71.4%, ether extractive 0.1%, protein 0.9%, sugar 0.7%, other soluble carbohydrates 6.7% crude fiber 0.5%, acids 0.5%, tannins 5.0%, Presence of pectin, mucilage, tartaric acid also reported. The activity of the drug is attributed to the presence of saponin 2-3%, in fresh fruits and 0.10% in dried whole fruit.

Pharmacological Actions: The pulp of fruit is nauseant, expectorant, diaphoretic and antihelminthic. It is also useful as a nervine sedative and antispasmodic.

Discussion

Deepana-Pachana helps to bring the Niramata of Sama Doshas and thus aids in bringing the Shakhagata Doshas or Tiryaka Doshas back to Koshtha. The process of Deepana-

Pachana also cures Agnimandya and thus prevents Ama formation, and helps for better effect of administered drugs. Acharya Charaka has mentioned four drugs under the heading of Medhya Rasayana viz. Guduchi, Shankhapushpi, Mandukaparni and Yashtimadhu, and it was reported from many research studies that all drugs possess neuro-regenerative, neuro-protective and nootropic properties. CP occurs due damage to the Mastulunga which is a prime site of Kapha, age of patients and also suggest the dominancy of Kapha in the Vata Vyadhi, which may be taken as Avarana Janya Vata Vyadhi, hence to remove that vitiated Kapha, some Srotoshodhana measures should be taken prior to start Panchakarma, Udvartana can be used for the same purpose. The effect of Abhyanga can be assumed in two way i.e. physical manipulations and the medicinal effect of the drug in the medicated oil, with physical manipulation in the form of massage increases the circulation of blood and plasma, it can stimulate and strengthen the lymphatic system and remove internal waste products, muscles and deep connective tissues get relaxation, nerve endings seated in skin and muscle spindles get stimulated. Effect of Basti can be understood by restoration of vitiated Vata, restores the displaced Kapha and Pitta at their original seats and the control gained over Vata leads to the Vighatana of Samprapti Ghataka of disease.

Conclusion

The present review illustrates that Ayurvedic management of the Cerebral palsy can be explored clinically with the understanding of ayurvedic pathogenesis of the disease and different drugs and procedures can prove beneficial for the management of the disease.

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