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Ayurvedic Approach to Cerebral Palsy in Children: A Critical Appraisal

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Abstract

Cerebral Palsy (CP) is a non-progressive neurological disorder caused by early brain injury occurring in the prenatal, perinatal, or postnatal period. It results in motor dysfunction, abnormal posture, and altered muscle tone. Cognitive, sensory, and speech impairments may also be present. Common causes include hypoxic-ischemic encephalopathy, prematurity, and intrauterine infections. Genetic mutations and metabolic disorders also contribute to its development. Diagnosis is primarily clinical, supported by neuroimaging such as MRI or CT scans. Management requires a multidisciplinary team approach. Physiotherapy, occupational therapy, and speech therapy form the core of rehabilitation. Assistive devices help improve mobility and functional independence. Medications like muscle relaxants and botulinum toxin help manage spasticity. Severe cases may need orthopedic surgeries or selective dorsal rhizotomy. Ayurveda considers CP under Vatavyadhi caused by Vata imbalance. Vata-pacifying therapies such as Abhyanga, Swedana, Basti, Nasya, and herbs like Ashwagandha, Brahmi, and Shankhapushpi improve neuromuscular functioning.

Key words : Cerebral palsy, Vata imbalance, Neuromuscular functioning.

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Cerebral Palsy is a condition resulting from non-progressive damage to the developing brain. As the most common cause of childhood disability, CP presents with abnormal muscle tone, posture and motor abilities, along with disturbances in sensation, reception, cognition, communication and behavior, it is a lifelong neurological disorder in which injury or abnormality of the developing central nervous system affects the development of motor function and body posture before, during or shortly after birth. Many factors before, during, and after birth can cause CP, which manifests with a variety of symptoms. However, PC is mainly caused by premature birth. CP affects approximately 2.5 in 1,000 births worldwide. However, the abnormality varies depending on age and severity as well as the qualitative and quantitative consequences of the disorder, such as hemiplegia and diplegia[7]. In India, three in every 1,000 births are affected by CP, and each year in the United States, approximately 10,000 newborns are diagnosed with CP, including 1,200 to 1,500 preschool age children[12]**.** The primary motor syndrome (physiological/ qualitative) of CP is clinically defined as spasticity, dyskinesia, athetosis, dystonia, ataxia, hypotonia, or a mixture. The three common features of cerebral palsy are abnormal body movement or posture, static brain abnormalities and acquired (unfancy-old) brain disorders, through these do not indicate the severity of motor problems. The topographic (quantitative) classification of cerebral palsy includes five type pf paralysis: tetraplegia, hemiplegia, paraplegia, monoplegia and triplegia. Because affected area often overlaps, monoplegia and triplegia are uncommon. Most CP cases (70-75%) are spastic, whereas hypotonia and ataxia occurs rarely.

Ayurvedic literature mentions various factors that may lead to conditions resembling cerebral palsy, including problems during conception, pregnancy, early labor, or the period following childbirth. According to Ayurvedic medical classifications, cerebral palsy is closely linked to *vatavyadhi* or *vatavikar*, which are disorders primarily caused by an imbalance of the *vata dosh*a or damage to the *shiro-marma*, which is associated with the brain. In clinical terms, it is similar to conditions such as *pakshaghat, ekangaroga, pangu, sarvangroga*, and *aakshepka*. Similar to cerebral palsy, *vatavyadhi* can occur at any stage of life, from the time of conception through old age, due to disturbances in vata that affect body movement and nerve functions. All these conditions are classified under the broader group of Vatavyadhi, and the line of management should be formulated according to the diagnosis established through Ayurvedic diagnostic parameters (Rogi-Roga Pareeksha) such as Dosha, Dushya, Srotas, Adhisthana, Vyaktasthana, Prakriti, and Asthavidha Pareeksha, ensuring a comprehensive and individualized therapeutic approach[15,16].

Prevalence and Developmental Rates:

Systematic review and meta-analysis published in 2019 analysed eight studies to determine the prevalence of cerebral palsy (CP) among Indian children. The findings indicated an overall pooled prevalence of approximately 2.95 per 1,000 children (95% CI: 2.03–3.88). The study also highlighted a scarcity of high-quality prevalence studies in India, suggesting that the observed prevalence is similar to global estimates. Additionally, a study focusing on the socio-demographic and clinical profiles of pediatric CP patients in Gujarat, India, reported an estimated

prevalence ranging from 2.1 to 3 per 1,000 live births[3,6,8,10,11]. However, there is a noted need for more comprehensive and high-quality studies to obtain precise national estimates.

Etiopathology :

Cerebral palsy can happen when a baby's brain doesn't develop properly or gets injured before, during, or soon after birth. Many things can contribute—like infections, poor oxygen supply, birth trauma, metabolic problems, or high bilirubin levels. Most babies who develop CP have more than one risk factor.

Premature babies often develop spastic diplegia, while full-term babies tend to show quadriplegia or hemiplegia. In many cases, the exact cause remains unclear. Modern research even suggests that birth asphyxia is usually a result of earlier brain damage, not the main cause[4].

Samprapti Ghatak :

The Samprapti Ghatak of Cerebral Palsy is illustrated in [Table 1], which outlines the *Doshas*, *Dushyas, Srotas*, and other key factors associated with the condition.

Table-1. Samprapti Ghatak components relevant to cerebral palsy

Dosha	*Vata Pradhana Tridosha*
Dushya	*Rasa, Rakta, Mamsa, Majja, Sukra*
Srotas	*Prana vaha, Rasa vaha, Raktavaha, Mamsa vaha, Majjavaha, Shukravaha*
Adhishtana	*Shiras*
Vyaktha Sthana	*Shiras*
Dushti Prakara	*Sanga, Vimarga gamana*
Rogamarga	*Madhyama*
Vyadhi Swabhava	*Chirakari*

Role of vata in cerebral palsy :

Vata governs regular enthusiasm, standard respiratory functions, and actions such as bending stretching, typical discharge of waste, and adequate nourishment of all the dhatus.

The Roles of Subtypes of *Vata*

The roles of the subtypes of *Vata Dosha* in various physiological functions and their disturbances are summarized in (Table 2). These include functions like mental clarity, digestion, and elimination, which are regulated by different subtypes such as *Prana Vata, Udana Vata, Samana Vata, Vyana Vata,* and *Apana Vayu.*

Table-2. Showing the roles of subtypes of *Vata Dosha*

Prana Vata	starting in the head (*Murdha*) and moving to the chest (*Uras*) and throat (Kantha), controls thinking (*Buddhi*), the heart (*Hrudaya*), senses (*Indriya*), mind (*Chitta*), and vision (*Dhruk*). It also manages physiological functions like spitting (*Shteevana*), sneezing (*Kshavathu*), belching (*Udgara*), normal breathing (*Nishwasa*), and swallowing (*Annapraveshana*). When disturbed, it can cause issues with higher mental functions, such as consciousness, memory, sleep, orientation, swallowing difficulties, and recurrent respiratory infections.
Udana Vata	which starts in the chest (*Ura*) and moves to the nose (*Nasa*), navel (*Nabhi*), and throat (*Gala*), controls verbal efforts (*Vakpravrutti*), initiation of actions (Prayatna), zeal (*Urja*), power (*Bala*), complexion (*Varna*), and recall (*Smriti*). When it is disturbed, it can cause speech disorders, weakened strength, coordination issues, and impair recollection.
Samana Vata	situated near the digestive fire (*Agni*) and moving throughout the digestive tract (*Koshtha*), controls the retention of food in the stomach (*Anna gruhnathi*), digestion (*Pachana*), separation of nutrients (*Vivechana*), and expulsion of waste (*Munchati*). When disturbed, it can lead to gastrointestinal issues and nutritional disorders.
Vyana Vata	located in the heart (*Hrudaya*) and circulating throughout the body, governs the distribution of nutrients (*Sara bhaga* of *ahara*) via the circulatory system (Rasa). It is responsible for actions such as walking (*Gati*), flexion (*Apakshepana*), extension (*Utkshepana*), and blinking (*Nimesha-Unmesha*). When disturbed, it can lead to nutritional issues, incorrect limb movements, and disorders of the ocular muscles.
Apana Vay	located in the testicles (*Vrishana*), bladder (*Basti*), penis (*Medra*), navel (*Nabhi*), thighs (Uru), groin (*Vankshana*), anus (*Guda*), and intestines (*Antra*). It is responsible for the elimination of semen (*Shukra*), menstrual blood (*Artava*), urine (*Mutra*), feces (*Purisha*), and foetus (*Garbha*). When disturbed, it results in problems with sphincter control.

Based on the explanations provided above, we can conclude that cerebral palsy arises from the disturbance of the *Panchavata*, due to injury to the vital points in the head (*Shiro marmaabhighata*), in different instances.

Nidana for *Shiromarma Abhighata :*

1.*Garbhapoorvaka nidana* :

The *Garbhapoorvaka Nidana*, which includes factors such *as Tulya Gotra Vivaha, Beeja Dushti, Ashaya Dushti,* and *Kala Dushti*, plays a significant role in the formation and quality of the offspring, as summarized in (Table-3).

Table-3. Showing *Garbhapoorvaka Nidana*

Tulya Gotra Vivaha	Marriages between individuals of the same *gotra* may result in hereditary diseases such as *Unmada* and *Apasmara* being passed on to the descendants.
Beeja Dushti	The presence of ailments like *Pangu* and *Khanja* is referenced in *Sahaja vyadhis*; therefore, if there is a disturbance in *beeja*, *beeja bhaga*, or *beeja bhaga avayava*, it can lead to the emergence of such conditions.
Ashaya Dushti	*Ashaya* refers to the *garbhashaya*; any structural or functional irregularities may cause defects in the formation of the *Garbha*[1].
Kala Dushti	There is specific guidance regarding the timing of conception, considering both the couple's age and the *Rutukala*, which influences the type of child conceived based on the conception days. Hence, all these factors will determine the quality of the offspring[13].

2. *Garbha kaleena Nidana* :

This encompasses the period from the union of sperm and egg until the birth of the baby as given in (Table-4).

Table-4. Showing *Garbha kaleena Nidana*

Inadequate *Garbhini Paricharya*	Specific dietary and lifestyle practices must be adhered to by the pregnant woman to ensure a healthy offspring. If she engages in inappropriate dietary and lifestyle habits, it could result in the birth of a child with conditions such as *Pangu* (lame), *Kubja* (hump-backed), *Andha* (blind), *Jada* (unresponsive), or *Vamana* (vomiting), and may also negatively impact the fetus's developing brain, causing injuries to vital areas in the womb[1].
Dauhruda Apachara	Once a woman becomes *dauhruda* (pregnant), if her desires are unmet or if she experiences psychological distress or disrespect, it could lead to the birth of a child with features such as *Kubja* (hump-backed), *Kuni* (crooked armed), *Pangu* (lame), *Mooka* (dumb), or *Minmina* (nasal voiced), which resemble characteristics of Cerebral Palsy[13].
Abhighata	Physical or psychological trauma may trigger vata *prakopa* (exacerbation of the vata dosha) in the mother, resulting in developmental abnormalities in the child[14].
Certain medications and treatment approaches	Treatments such as *Vamana*, *Virechana*, *Nasya*, *Raktamokshana*, and *Dhumapana* are entirely contraindicated for pregnant women. If any of these are administered, it could lead to miscarriages, abortion, or the baby being born with conditions like *Kuni*, *Andha*, or weakened senses[1].

3. *Prasava Kaleena Nidana :*

Factors during the process of labor, such as *Vilambita Avi, Akala Pravahana,* and *Murdhabhighata,* are significant contributors to neonatal complications and *Vata* vitiation, as detailed in (Table-5).

Table-5. Showing *Prasava Kaleena Nidana*

Vilambita Avi	Prolonged and weak uterine contractions, referred to as *Vilambita Avi*, can cause distress for both the mother and the baby, resulting in *shiro marma* injury to the child as well[1].
Akala pravahana	occurs when the woman exerts bearing down efforts without the presence of uterine contractions, potentially leading to conditions such as *Badhira*, *Mooka*, and *Vyasthahanu*, as well as *Vata* disorders arising from *shiro marma* injury[14].
Murdhabhighata	refers to injuries to the head during delivery due to factors such as instrumental assistance or an imbalance between the size of the head and pelvis, which can provoke *vata* and result in deformities in the child.

4. Prasavottara kaleena nidana :

Postnatal factors such as *delayed Pranaprathyagamana, Stanya Dushti*, influence of *Grahas*, and early-life diseases like *Jwara* and *Atisara* contribute to the manifestation of motor deficits in cerebral palsy, as summarized in (Table-6).

Table-6. Showing *Prasavottara kaleena nidana*

Delayed *Pranaprath-yagamana*	Any delay in carrying out the pranaprathyagamana procedure can result in hypoxic damage to the brain, which is essentially *shiromarma abhighata*.
Stanya Dushti	If a mother becomes pregnant while still breastfeeding, the child may experience *Garbhaja phakka*, which includes not just nutritional deficiencies but also motor impairments**.**
Grahas	Certain *Grahas*, such as *Skanda*, *Skandapasmara*, and *Mesha*, can lead to permanent disabilities in the child and are considered to have an infectious origin.
Nija and Agantu vyadhis	Conditions like *Jwara*, *Atisara*, and *Pandu* can result in *Vyadhija Phakka*, which is characterized by specific motor deficits.

Rupa :

Clinically, spastic cerebral palsy is further classified as follows-

Shiromarmabhighataja Vata vyadhi – the clinical manifestations include – *Manya Stambha* (difficulty in involuntary jaw movements), *Udweshtana* (rigidity of body parts), *Ceshtanasha* (diminished movements and activities), *Gadgada Vak* (issues with speech), *Chakshu Vikbhrma* (eye abnormalities), *lala srava* (increased saliva drooling), and *Swarahani* (speech irregularities)[14].

This can manifest in different ways such as –

Pakshavadha – there will be a loss of function on one side of the body due to the impairment of *Matulunga Majja* caused by various factors[14].

Pangutva–walking will be challenging, with both lower limbs impacted due to aggravated *Vata* in the *Kati* region[13].

Ekanga Vata – disturbed *Vata* will localize in such a manner that only one limb is involved[1].

Sarvanga Vata – there will be contraction of the hands and feet (*sankuchana*), with the vitiated *Vata* affecting the entire body.

Diagnosis of Cerebral Palsy in Ayurveda :

In *Ayurveda,* cerebral palsy is mainly diagnosed through assessing *Dosha, Dushya, Srotas,* and developmental history. It is considered a *Vata Vyadhi*, where imbalance of *Vata dosha* leads to impaired neuromuscular function. Diagnosis focuses on delayed milestones, abnormal muscle tone, and reflex or speech issues. Examinations like *Rogi-Roga Pariksha, Dashavidha Pariksha,* and *Ashtavidha Pariksha* help determine the child's *Prakriti,* disease stage, and strength. Birth history, maternal health, and signs of *Garbhaja vikara* are also evaluated to identify the root cause.

Comprehending Spasticity in Ayurveda :

Given that the condition is marked by *Sonkocha* and *Gatra stabdhata*, it can be concluded that *Vata* and *Kapha* are engaged. Moreover, the *Srotodushti prakara* reflects *Sanga* and *Vimargagamana*. Therefore, the treatment should focus on alleviating both *Vata* and *Kapha*.

Chikitsa:

Given that *Vata* is the primary *Dosha* involved, measures that target *Vata* should be implemented.

a. Abhyanga : This is a procedure that helps alleviate elevated *Vata*, enhances the condition of *Drushti* (vision) and *Pushti* (nutrition), promotes restful sleep, improves skin health (*Sutvaktva*), and lends sturdiness to the body (*Dardhyakara*). *Abhyanga* should be performed using oils prepared with *Vata*-reducing herbs such as *Bala*, *Ashwagandha, Sahachara*, and *Prasarini*, with *Tila taila* being the preferred choice. *Raja Taila Abhyanga* is recommended for treating *Phakka*, as *Raja Taila* is effective for ailments like *Pangu* and *Jadata*.

b. Swedana : This technique aids in relieving *stambha* (stiffness), *Gaurava* (heaviness),

and *Jadyata* (immobility) in the limbs. It is a valuable procedure, especially in conditions like *Jada* and *Pangu*. Upanaha is deemed the best for addressing *Sthambha* and *Sankocha*. *Parisheka* helps alleviate stambha by easing muscle tension[1].

c. Basti : *Basti* is considered the most effective treatment for *Vata*-related disorders. According to the *chikitsa sutra* of *shiromarma*, basti is a recommended approach for *vatavyadhi* and can be administered to children as young as one year[1].

d. *Physiotherapy :* *Acharya Kashyapa* described the use of *Phakka ratha* for treating *phakka*, which can be interpreted as a form of walking exercise for children.

e. The primary characteristic of Spastic Cerebral Palsy is spasticity, which can be likened to *stambha*. The main *Dosha* involved in this condition is *Vata-Kapha*. *Swedana* is specifically known for its efficacy against *Sthambha*. Therefore, in this study, both *Parisheka Sweda* and *Upanaha Sweda* were utilized. As the disease is localized in the head region (*shiras*), *Shirodhara* is also recommended.

Cerebral Palsy (CP) is a non-progressive neurological disorder affecting movement, posture and coordination, arising from brain injury occurring in the prenatal, perinatal or postnatal period. Contemporary management comprises physiotherapy, medications, and surgery for enhancing mobility and quality of life. *Ayurveda* attributes CP to *Vatavyadhi*, specifically *Shiromarmabhighataja Vata Vyadhi*, due to an imbalance of *Vata Dosha*. Treatment involves *Panchakarma* procedures such as *Abhyanga* (massage with oil), *Swedana* (steam treatment), and *Basti* (medicated enema), in addition to herbal medicines for the support of neuromuscular function. Combining contemporary rehabilitation and *Ayurvedic* interventions provides a full spectrum of CP treatment for improved relief of symptoms and functional enhancement. Standardized protocols need to be established, and more work is required in this area.

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