INTRODUCTION

Cerebral palsy (CP) is defined as non progressive neuromotor deficit of cerebral origin due to any antenatal perinatal or early postnatal insult of the developing brain. Mental retardation although present in > 50-75% cases but not an essential feature of cerebral palsy.[1] Brain growth is nearly complete by 2-3 years of age and CP is a clinical manifestation of developing brain injury during this period, irrespective of the cause, commonest being adverse perinatal event like prematurity and birth asphyxia. Motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior. CP is classified into five types i.e. spastic, athetoid, ataxic, atonic and mixed.[2]

CP is the most common and costly form of chronic motor disability that begins in children; data from the centers for disease control and prevention indicate that the incidence is 3.6: 1000 children with a male:female ratio of 1.4:1.[3] Spastic CP accounts for a major portion of CP with incidence between 70% and 80%.

Autologous stem cell activation treatment to expand the blood vessels and nourish the neurons, strengthening of body's immune system, stem cell transplantation procedure, Botulinum toxin type A injection, baclofen intrathecal injection, selective dorsal rhizotomy, orthotic devices such as ankle-foot orthoses, hyperbaric oxygen therapy, neuroplasticity are the newer advancements being tried out in the management of CP.[4]

Ayurveda has a separate branch of clinical specializtion concerning child healthcare known as Kaumarbhriya. There is no one to one correlation available in Ayurvedic classics with CP, but there are many conditions and some causative factors linked to etiopathology for such type of disease condition described in many chapters in different texts. Some conditions which find an overlap of symptoms of CP include Ekangaroga (monoplegia), Sarvangaroga (quadriplegia), Paksaaghatu (hemiparesis), Paksavadhu (hemiplegia) Phakka (a kind of nutritional disorder), Pangsuya (locomotor disorders), Mukatva (dumbness), Jadatva (mental disorders) under the group of vata vyadh (neurological disorders). Contributory factors like inappropriate rita (ovulation cycle), ksetra (uterus), Bija (sperm and ovum), ambul[5] (amniotic fluid and foetal nutrition) Dauhrdavamanana (neglect of urges during dauhrda stage of pregnant women), presence of garbhopahatakarabha (substances which can cause defects or death of fetus), incompatible garbhavaardhikarabha (normal requisites for growth and development of fetus) and improper Garbhiniparicarya (antenatal regimen) may have undesirable effects on the fetus hampering its normal growth and development consequently leading to many diseases, deformities, and even death. Considering all the
above, we have formulated an Ayurvedic therapy protocol to improve the condition of CP patients.

CASE REPORT

Basic information of the patient
Age: 3 years
Sex: Male
Religion: Hindu
Socioeconomic status: Middle class.
Family history: Father has studied 12th standard and currently working as a servant. Mother has studied 10th standard and she is a house wife. Total no. of family members are 4 and sibling of patient is one. Parents had 3rd degree consanguinity marriage.

Pradhanavedanavisesa (chief complaints)
Unable to stand with or with support.
Global delayed milestones.

Vartamanavyadhivrtta (history of present illnesses)
Patient was preterm normal delivered and did not cry soon after birth and suffered from birth asphyxia 2nd grade with one episode of seizure. Due to all these clinical complications, the child could not achieve normal growth and development. Spasticity and involuntary movement became apparent after the age of 5 months and since then the parents started treating the child going to many doctors without any significant benefit. They approached us for further management.

Purvavyadhivrtta (history of past illness)
Patient was suffered from Birth asphyxia. One episode of seizure at the time of birth seizure No h/o Jaundice/Meningitis/Trauma/encephalitis.

Cikitsavrattanta (Treatment History)
He was undergoing physiotherapy and also had undergone treatment by botox injection (to reduce contractures).

Kulajavrattanta (Family History)
Parent has 3rd degree consanguinity marriage.

Birth history
Antenatal: Mother (23 years) has taken folic acid in the first trimester no H/o any fever, rashes, vaginal bleeding etc in 1st trimester. Mother had taken Inj. TT (two doses) in 2nd trimester. No h/o hypertension, anemia etc.

Perinatal: Preterm (32 weeks) normal delivery was done. Baby did not cry soon after birth. Birth weight was 1.8 kg (low birth weight). Liquor was clear. No any congenital anomalies were seen. Postnatal: Baby had suffered from birth asphyxia 2nd grade with one episode of seizure.

Vriddhabhisamkriti (history of immunization)
Patient has taken BCG, DPT, HiB, HBV and Measles at the proper for age as per schedule.

VaiyaktikaVrattanta (personal history)

Aharaja
Patient was totally dependent for food intake, and was eating only semi solid and solid food. Appetite was poor. Diet was dominant in madhura rasa (sweet).

Viharaja
Nature of activity was always assisted (due to spastic diaplegia). Sleep was disturbed (2–3 h/day, 6–7 h/night).

Examination
Vitals were normal. Cardiovascular system, respiratory system and per abdomen examinations had shown no deformity. Prakriti (constitution) was vata pradhanakaphaja.

Ashtavidha Pariksha
Nadi (pulse) was vatadhihakridosaja. There was no complaint with regard to Mutra (urine). Frequency and color were normal. Mala (stool) was constipated and passes with a foul smell and dark color, once in two days. Jihva (Tongue) was sama (coated due to improper digestion). Sabda (speech) was not learnt (monosyllables should have been learnt by 9 months of age). Spatha (touch) was kahra (dry due to hypertonia and spasticity). Druk (eyes) was normal. Akruti (appearance) was lean (due to malnourishment).

Central Nervous System Examination
Patient was diagnosed to have the hypertonia (spasticity) and contractures at ankle and knee joint. Scissoring of legs due to persistent spasm of adductor muscles. Restricted joint mobility Muscle power could not be elicited because patient was unable to follow the command. Sensory system was intact, and no abnormality found. Hyper-reflexia was present, suggestive of upper motor neuron disease (which is the hallmark of CP). Babinski sign was up going (positive). Meningeal signs were not present.

Differential diagnosis
Spastic CP, Athetoid CP, Atonic CP, Ataxic CP, Muscular dystrophy.

Diagnosis
Diaplegic spastic cerebral palsy due to sequel of postnatal hypoxia and clinical examination.
Probable Pathophiology and Its Management.

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Criteria for Assessment

Anthropometrical measurements, developmental milestones, Modified Ashworth Scale (MAS)\(^{19}\), spasm scale to assess intensity of spasm, manual ability classification system (MACS)\(^{20}\), reflex scale to assess deep tendon reflex, and muscle power grading\(^{21}\) were taken as assessment criteria to observe the effect of therapy.

Treatment Protocol

Overall Ninety days treatment given as below: three days pachana followed by 5 days Udavartaana followed by 7 days snehana by bala taila with shashhti shali pinda sweda followed by 30 days karma basti. Two such courses were done with the interval of 14 days.

Panchakarma

- **Pachana**- with Ama Pachaka vati 1 tab. and shunthi chirna 5 gm twice a day with lukewarm water twice a day for 3 days.
- **Udavartaana**: With lukewarm Yava and Kullattha Churna (20 min) for 5 days.
- **Abhyanga**: With lukewarm Bala Taila and Tila Taila (20 min) followed by Shashshi Shali Pinda Sweda (20 min) for 7 days.
- **Karma basti**\(^{9}\) for 30 days, in which 1 Anuvasana Basti in beginning and then 12 set of Anuvasana and Ashapana Basti followed by 5 Anuvasana Basti at last were given. Anuvasana Basti was given with Bala Taila with 30 ml dose. Ashapana basti was given with dashmula kwatha with 120 ml dose.

Such two courses were repeated with the interval of 14 days between each course. Total duration of the treatment is Ninety days days.

Internal Medicine

Dasmularishta 2tsf mixed with equal water, twice a day after meal throughout treatment schedule, except the days on which Basti was given.

DISCUSSION

Delayed development of gross and fine motor function may be due to a problem in normal function of Vata (Pravartaka Cheshtanam ucchavchanam).\(^{10}\) Hence, to achieve results in developmental disorders, function of Vata (normal physiology) should come to normal.

Udvartana had given a well platform for further procedures like Abhyanga, Swedana and Basti by removing Avarana and Srotorodha\(^{11}\). Abhyanga and Swedana caused Dosha Gati from Shaka to Koshtha, which helped in removing vitiated Dosha through Basti. Finally, Basti helped to accomplish the effect of Shodhana. Thus by the combined effect of total therapeutic measures, Avarana was removed, Mastulanga Majja got nourishment, Vata came to normalcy, and hence the proper development of milestones were achieved.

Elbow and knee flexion improved by 10° and ankle plantar flexion decreased by 10°. This effect might have been achieved due to localized vatasamana by sudation and systemic vatasamana by Basti. Udavartaana helps opening up the minute channels and hence may have improved blood and lymphatic circulation. Massage provides nourishment due to its Snigdha, Mridu (soft), Picchila (sticky) qualities. Sudation causes excretion of waste metabolites through diaphoresis. Snigdha Basti (Anuvasana with Balatalia) is said to have Brughhana effect. Height might have increased due to decrease in joint contractures. Tightness of Achilles tendon was reduced and due to that only the ankle joint shows improvement in goniometric evaluation.

Spasticity is characterized by increased resistance by passive stretch, velocity dependent and asymmetric about joints (i.e., greater in flexor muscle at the elbow and the extensor muscle at the knee).\(^{12}\) This may happen due to avarana of vata, wherein, due to avarana, vayu cannot perform its normal function, that is, normal movement of joints (pravartakacestamam). Ashwarth scale shows 20% improvement in spasticity because initially udvartana would have helped in a reduction of vitiated kapha by its dryness-inducing and blockage-removing properties. Once avarana is removed, vitiated vata can be pacified by further treatment. Vayu resides in sparsanendriya which is located in the skin. Massage is said to be as tvachya (good for the skin). Hence, massage might
have directly worked on vata to bring it back to normalcy. Basti acts on CNS by stimulating enteric nervous system (ENS), there are many evidences linking CNS and ENS.

Spasm scale shows 25% improvement, due to sannya of vatagunas which are cala and sita due to the action of massage with balataila, sudation, and meristasodhana asthapana Basti.[13]

Manual ability classification system shows 20% improvement due to a reduction in spasticity and improvement in ROM.

CONCLUSION
The selected Ayurvedic treatment modality is effective in relieving the signs and symptoms and thus reducing the disability in children with diplegic Spastic CP. In this patient, the overall effect was found near 20-30%. Panchakarma is effective in improving growth (height, weight, CC) and development (standing without support walking with support), reducing spasticity of lower limb, and spasm in patients.

As this disorder is incurable, this percentage of improvement also helps the patient to improve the quality-of-life (QOL). Treatment of this kind of condition is important and in that, if we are able to make small improvements in an earlier age, then it will reflect as a major benefit in later age in the form of developing skills. Previously, it was believed that neurons do not repair or rejuvenate after any injury, but the new concept of neuroplasticity says that CNS have the ability to repair their neurons by axonal sprouting to take over the function of damaged neurons. This improvement in patients also supports the concept of Neuroplasticity. So, we can conclude improvement in QOL by Ayurvedic Paõcakarma therapy along with appropriate internal medication.

REFERENCES
7. Carnahan KD, Arner M, Hägglund G. Association between gross motor function (GMFCS) and manual ability (MACS) in children with cerebral palsy.
8. Santosh Kumar, Pediatric Clinical Examination, 4th edition, Paras Medical Publisher, PN. 201.