

Some Efficacious *Ayurvedic* Panchakarma Procedures in Children with Cerebral Palsy

Abstract

Cerebral palsy (CP) is defined as a non-progressive neuromotor disorder of cerebral origin. Motor disorders of CP are accompanied by disturbances of sensation, perception, cognition, communication and behavior. In *Ayurveda*, there is no single condition / disease which exactly show similarity with CP. Most of the authors considered CP as vata vyadhi. Various Panchakarma procedures like Udwartana (medicated powder massage), Sarvaanga abhyanga (full body massage with medicated oil), *Baashpa sweda* & *Naadi sweda* (steam bath) and *Vasti* (oil and decoction enemas) etc are found to be beneficial in the management of CP in children. Present study is focused on *panchakarma* procedures which are commonly used and found effective in children with CP. *Udwartana* opens the minute channels and improves blood as well as lymphatic circulation. *Udwartana* is *kapha*, *vata hara* and removes *aavarana* or *srotorodha*. It provides a platform for further procedures like *abhyanga*, *swedana* and *vasti*. *Sarvanga abhyanga*, *baashpa* & *naadi sweda* reduce spasticity (especially scissoring phenomenon), improves flexibility of joints, improves circulation and reduces pain. *Vasti* is the major treatment for CP and it improves gross as well as fine motor functions, provides nourishment, improves overall general condition and quality of life in children with CP.

Keywords: Panchakarma; Ayurveda; Cerebral palsy; Vasti; Sweda; Nasya

Review Article

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Introduction

Cerebral palsy (CP) is defined as a non-progressive neuromotor disorder of cerebral origin. Motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication and behavior. CP is classified into four types, spastic, ataxic, dyskinetic and mixed. Spastic CP accounts for a major portion of CP [1]. In India, the prevalence of CP is estimated around 3 cases per 1000 live births. There is no known cure for all four subtypes of CP [2]. Stem cell transplantation procedures, Botulinum toxin injections, intrathecal injection of baclofen, using various orthotic devices, hyperbaric oxygen therapy, neuroplasticity etc are the new advancements evolved for managing CP. [1]

In *Ayurveda*, there is no single condition / disease which exactly show similarity with CP. Some conditions explained in *Ayurveda*, which have shown some similarity with CP are, *phakka* (a kind of nutritional disorder), *pangulya* (locomotor disorders), *mukatva* (dumbness), *jadatva* (mental disorders), *ekanga roga* (monoplegia), *sarvanga roga* (quadriplegia), *pakshaghata* (hemiparesis) and *pakshavadha* (hemiplegia) etc., *vatavyadhi*'s (neurological disorders) [1]. Spastic CP can be considered as '*Avarana janya vata vyadhi/Kaphavrita vata*'. *Vata vyadhi* is the most similar condition to CP [3]. According to some authors, CP in *Ayurveda* can be considered as '*Shiro-Marmabhogathaja Bala Vata Vyadhi*' [4].

Ayurvedic Panchakarma (five major *ayurvedic* procedures and many allied procedures which are intended to cleanse the body) therapy along with appropriate internal medication

can provide good improvement in quality of life of CP patients [1]. It is well known fact that internal medication along with *Panchakarma* procedures is more effective when compared with only oral medications [2]. Various *panchakarma* procedures like *Udwartana* (medicated powder massage), *Sarvaanga abhyanga* (full body massage with medicated oil), *Baashpa sweda* & *Naadi sweda* (steam bath) and *Vasti* (oil and decoction enemas) etc are found to be beneficial in the management of CP in children. [5] Present study is focused on various *panchakarma* procedures which are commonly used and found effective in the management of CP in children.

Review Methodology

Electronic database, 'Google scholar' has been searched for relevant studies and reviews published / appeared from 2007 to December 2017. The key words used for search are, '*Udwartana* in cerebral palsy children', '*Sarvanga abhyanga* in cerebral palsy children', '*Naadi sweda* in cerebral palsy children', '*Baashpa sweda* in cerebral palsy children', '*Shashtika shali pinda sweda* in cerebral palsy children', '*Vasti* in cerebral palsy children' and '*Nasya* in cerebral palsy children'. Abstracts and full texts of open access articles in English language were only considered.

Panchakarma

Panchakarma is a collective term which indicates five major therapeutic procedures of detoxification to cleanse the body channels, along with many other supportive procedures. Literally, *Panchakarma* is made up of '*Pancha*' means 'five' and '*karma*' means 'procedure / action' (procedures of purification).

Ayurveda treats diseases by using two different methods, *shodhana* (purificatory) and *shamana* (pacificatory). *Shodhana* means cleansing or detoxification of the body by expelling the deranged doshas (morbid materials inside the body causing various diseases). *Shamana* is pacification of symptoms without eliminating the morbid doshas. Typically, all treatment protocols ought to begin with *shodhana*, followed by *shamana* for better outcomes. When the body is saturated with toxins, the toxins interfere with the absorption of herbal medicines. Furthermore, it is necessary to eliminate *ama* (accumulated toxins in the channels) and to re-establish the homeostasis. The five main procedures within *panchakarma* are: *vamana* (emesis), *virechana* (purgation), *nasya* (nasal instillation of herbal oils/powders), *basti* or *vasti* (herbal enema), and *raktamokshana* (bloodletting). Primarily, these practices are aimed at eliminating *ama* (toxins) from to body and cleanse the channels. Each procedure is performed in three phases: *Poorva karma* (preparatory methods), *Pradhana karma* (main procedure) and *Paschat karma* (post-cleansing procedures which include dietary and behavioural regimen) [6].

Panchakarma is the ultimate mind body healing experience for detoxification of the body, for strengthening the immune system, to restore the balance and wellbeing. It is one of the most effective healing modality of *ayurveda*. Prior to *panchakarma*, *poorva karma* like *deepana* and *paachana* (appetizers and digestives), *snehana* (oleation) and *swedana* (sudation) are given to the patient. *Ayurveda* considers that the purification of the body is important before the commencement of any other therapy. *Shodhana chikitsa* (purificatory or cleansing procedures / *panchakarma*) is considered superior to *Shamana chikitsa* (treating with internal medicines) because the condition treated with *shodhana* therapy will never recur, whereas the condition treated with *shamana* therapy may recur in due course of time [7].

Some Effective Panchakarma in CP

Various *panchakarma* procedures like *Udwartana* (medicated powder massage), *Sarvaanga abhyanga* (full body massage with medicated oil), *Baashpa sweda* & *Naadi sweda* (steam bath), *Shashtika shali pinda sweda* – SSPS (sudation with a bolus prepared by boiled rice), *Nasya*, *Shirodhara* (oil drip over the forehead) and *Vasti* (oil and decoction enemas), are found to be beneficial in the management of CP [1-19]. Present study is focused only on few *panchakarma* procedures which are commonly used and found effective in the management of CP like *Udwartana*, *Sarvaanga abhyanga*, *Baashpa sweda* & *Naadi sweda*, *Shashtika shali pinda sweda*, *Nasya* and *Vasti*.

Udwartana

Rookshana procedure (dryness inducing procedure) like '*Udwartana*' seems to be beneficial in reducing the spasticity in CP patients and it is suitable in '*Amavastha*' (accumulation of waste materials inside the body) or '*Kapha aadhikya*' (predominance of *kapha dosha*) [5] (). Considering the *Bahya karma* (external procedure), the *Udwartana* is the *rookshana poorvakarma* (preparatory procedure which induces dryness) used with powders of medicines it brings the *Rukshana* at the level of superficial *Dhadhus* (tissues) especially at the level of *Twak*, *Raktha*, *Mamsa* and *Meda* (skin, blood, muscle and fat). [11] For

ama pachana (metabolizing accumulated toxins in the body) purpose *rookshana* procedure like *udwartanam* with '*kola kuluthadi choornam*' (a medicated powder used for *Udwartana*) can be used. *Udwartana* brings lightness in body, improves appetite and relieves pain. After attaining *niraamavastha* by *udwartana*, *snehana* and *swedana* etc procedures can be started [20]. *Udwartana* helps in reduction of vitiated *kapha* by its dryness-inducing and blockage-removing properties. Once *aavarana* (blockage) is removed, vitiated *vata* can be pacified by further treatment [1]. *Udwartana* opens the minute channels and improves blood as well as lymphatic circulation.



Figure 1: Udwartana.

Sarvaanga abhyanga

The term *Abhyanga* (Figure 2) is used as a synonym of oil bath. This is advised to be practiced daily. Oil is anointed all over the body, especially on the head, in the ears and on the feet. Specific oil should be selected according to the type of the disease or the temperament. For a person with *vata* temperament medicated oils like *ksheerabala*, *balaguduchyadi*, *karpasastyadi* etc; for *pitta* temperament oils like *bhringamlakadi*, *manjishtadi*, *kayyanyadi* etc; and for *kapha* temperament oils like *eladi*, *asanavilwadi*, *marichadi* etc can be used [21]. *Abhyanga* provides nourishment due to its *snigdha* (unctuous), *mridu* (soft) and *picchila* (sticky) qualities. *Vayu* resides in *sparsanendriya* (skin) and massage is said to be as *tvachya* (good for the skin). Massage directly works on *vata* to bring it back to normalcy [1]. *Abhyanga* along with *swedana* and *vasti* removes *aavarana* and *srotorodha* (obstruction of channels). *Abhyanga* and *swedana* together divert the *dosha*'s from *shakha* to *koshta*, later from *koshta dosha*'s can be managed by *vasti* or other *panchakarma* procedures. When *vata* comes to normalcy development of milestones will become normal [2]. *Abhyanga* reduces increased muscle tone, improves muscle bulk and power in CP cases [3].

Abhyanga involves cutaneous manipulation and it is considered as one of the prime procedures for mitigating *vata*. Primarily it acts by two mechanisms *i.e.*, local and central. The local mechanisms include cutaneous stimulation causing the arterioles to dilate and thereby achieving more circulation. It also assists venous and lymphatic drains. This state of hyper circulation also enhances the trans-dermal drug absorption and assimilation. Massage improves blood supply to muscles, relieves muscular fatigue and reduces stiffness. Massage stimulates sensory nerve endings of the skin and gives abundant sensory inputs to the cortical and other centers in central nervous system. *Snehana* and

Svedana are the prime procedures in treating various neurological conditions [4]. *Abhyanga* procedure is the mechanical stimulation more precisely the pressure application during massage. Pressure application done in proper way can help in reduction of motor neuron hyper-excitability by reducing the alpha motor neuron activity. A study reported that in hemiparetic subjects the H-reflex was depressed during both continuous and intermittent tendon pressure. Intermittent pressure was found more effective than continuous. In a study, cerebral palsy symptoms in children were decreased following massage therapy [9].



Figure 2: Sarvanga Abhyanga.

Abhyanga is *Kaphavatahara*, *Pushti* (health promoting) and *Ayurvedhaka* (increases life span). *Abhyanga* nourishes the superficial and deep muscles and make the muscles strong and joints stable. *Abhyanga* induce pleasantness and calming effects [10]. The strokes used in *Abhyanga* like kneading; friction etc improves local circulation [13]. The procedure which causes unctuousness, fluidity, softness, and moistness in the body is *snehana* or oleation therapy. *Abhyanga* and SSPS both cumulatively help in reduction of spasticity and facilitate free movement of joint preventing from deformities and contractures in CP cases [17]. Massage of the entire body with medicated oils like *Bala tailam*, *Narayana tailam*, *Prasarini tailam*, and *Mashadi tailam* are very effective. Massage involving concomitant stretching maneuvers is very beneficial in patients with spastic diplegia resulting from CP [19].

Baashpa sweda & Naadi sweda

Swedanam (sweating / diaphoresis / sudation) is a prerequisite for all *shamana* (pacifying treatments) courses and it provides temporary and lasting relief in many ailments. Many types of *swedana* are explained; among them '*Baashpa sweda*' or '*Ooshma sweda*' (steam bath) and '*Naadi sweda*' (tube sweating) (Figure 3) are commonly used. In *baashpa sweda* the patient may sit or lie on a chair or on a wooden table and whole body is exposed to steam. Sweating is induced by means of steam coming from the fluid which may contain many herbs or other liquids such as *dhanyamla* (an alcoholic beverage prepared from grains) or wine or milk etc in *baashpa sweda*. In *naadi sweda* a spouted pitcher or pressure cooker (which should be filled with liquids and herbs) is used and patient is exposed to steam coming out of the spout or a tube which is fitted to a narrow-mouthed vessel (pressure cooker) over the required body part [22].



Figure 3: Naadi sweda & Baashpa sweda.

Sudation causes excretion of waste metabolites through diaphoresis [1,8]. *Swedana* along with *abhyanga* removes *aavarana* and *srotorodha* [2]. *Swedana* is *sthambhagna* (relieves spasticity), *Sandhichestakar* (improves joint mobility), *Srotoshuddhikar* (cleanses channels) and *Kaphavata nirodhaka* (pacifies *kapha* and *vata*). Thus by its action the '*Sroto sanga vighatana*' (removal of obstructions in channels) may take place and stiffness of the joints relieved [10]. *Swedana* relieves heaviness, stiffness and coldness in the body parts [7]. The treatment plan should be that of *vatashamana* in CP, *vata* being dominant *dosha* involved. Management of *vata* disorders includes *snehana*, *swedana* and *vasti* [19]. Thus *swedana* procedures like *baashpa sweda* and *naadi sweda* both has an important role and proved their efficacy (especially in reducing spasticity) in the management of CP.

Shashtika shali pinda sweda

In SSPS (Figure 4) heat, massage and pressure are provided which nourishes muscles and stimulate nerve endings. This is the common method of *swedana* used in paediatric patients in which specific part or whole body made to perspire by the application of *shashtika shali* (a variety of rice) in the form of *pottalis* (boluses tied in a cotton cloth). *Shashtika shali* is cooked with milk and decoction of herbs. This cooked rice is to be kept in pieces of cloth to make *pottalis*. Remaining decoction and milk should be mixed and heated in low temperature to dip the boluses for warming the *Pottali*. After creating *pottalis*, patient is massaged with suitable warm oil and then warm *pottalis* gently applied. The procedure takes about half to one hour [15].



Figure 4: Various steps of Shashtika Shali Pinda Sweda.

Shashtika rice (*Oryza sativa* Linn) is *Snigdha* (unctuous), *Bala vardhana* (tonic) and *Deha dardhyakrita* (makes the body strong). The heat provided by bolus of *Shashtika shali* dipped in *Balamula kwatha* (roots of *Sida cordifolia*) with *Godugdha* increases the blood flow locally, relieve muscle spasm, increase tendon extensibility and provides pain relief. *Bala* absorbed locally provides nourishment to muscular tissue and prevents from emaciation. Combined effect of *Abhyanga* and SSPS (Figure 4) along with Physiotherapy helps to reduce spasticity, facilitate the free movement of the joints and to prevent development of deformities and contractures in CP patients. It also provides nutrition to muscular tissue thereby preventing from atrophy and detrimental changes [9]. SSPS or *Navarakkizhi* is the most important *sweda* method used in hemiplegia, opisthotonus, emprosthotonus, wasting paralysis and other chronic *vata* diseases [22]. SSPS is a *Brimhaniya Snehika* (tonic) sudation performed by bolus of boiled *Shashtika Shali* with *Vatahara Kwatha* (decoction of *vatahara* herbs) and milk [13]. Thus SSPS is one of the most preferred method of *swedana* for CP patients where muscle wasting and weakness present.

Nasya

Nasya is the process of administration of medicines through nostrils. *Nasya* is indicated mainly in aggravated and accumulated *doshas* (disease causing factor) of head and neck. Commonly used medicines for *nasya* are *panchendriyavardhan tailam*, *dhanvantaram tailam*, *anu tailam*, *shadbindu tailam* and *shunthi churna* (powder of *Zingiber officinale*) for *pradamana nasya* (nasal administration of herbal powders). *Kashyapa* has mentioned two types of *nasya*; namely *Brimhana nasya* (nourishing) and *Karshana / Shodhana nasya* (cleansing). During *nasya* the patient should sit or lie down in a comfortable posture, then applied gentle massage over the head, forehead and face followed by mild *swedana*. Slightly warm oil should be instilled in the prescribed dose in each nostril. After that gentle massage is to be performed on the plantar and palmar regions, shoulders and back. After the procedure, oil on the face is to be wiped off and advice to patient for gargling with warm water [15].



Figure 5: Various steps of Niruha vasti.

Snigdha Basti (*anuvāsana* with *balatailam*) (oil enema) is said to have *brimhana* (nourishing) effect. It is found that *vasti* improves the flexibility of joints in cases of CP by *vatahamana*. [1, 2 & 8] *Vasti* is '*Artha chikitsa*' (half of the treatment) of *vata* and most important *panchakarma* in CP. There are many types of *vasti* like *niruha* (decoction enema), *anuvāsana* (oil enema) and

Nasya karma is mainly intended to cleanse the channels in the head and neck region. The aggravated *kapha dosha*, which usually blocks the upper respiratory tract, is eliminated with the help of nasal instillation of herbal juices, oils, or powders. Herbal smoke (*dhooma*) is also used for inhalation through the nose to remove sticky phlegm from the channels. [6] *Nasya* has a definite role in treatment of CP because it is said to be beneficial in various *shiro roga's* (diseases of head / brain) according to *Acharya Charaka*. *Pratimarsa nasya* (*nasya* of small dose / *nasya* used for daily purpose) may have beneficial effects in patients of CP as it provides strength to *shira* (head) and *shirogata indriyas* (sense organ in head). [19]

Vasti:

Vasti is the procedure where the medicines in suspension form are administered through rectum or genitourinary tract using *Vasti yantra* (enema can or specific apparatus). Among all therapeutic procedures, *vasti* is superior because it is like *amruta* (nectar) for child patient and the most appropriate remedial measure for *vata dosha*. *Vasti* is prepared by using various medicated oils, *kwatha* (decoction) & *kalka* (paste prepared by herbs), *madhu* (honey) and *saindhava* (rock-salt) (Figure 5). The patient is advised to lie down in left lateral position. Small amount of oil is applied on patient's anus and also on *vasti netra* (nozzle). The *vasti netra* is gently inserted into the anal canal up to a specific length and *vasti putaka* (pouch or bag) containing mixture (*vasti dravya*) is pressed with a uniform pressure. The pressure is continued till only small quantity of fluid remains in the bag to avoid air insertion. Then the nozzle is removed gently and the patient is allowed to lie down on supine position till he feels urge to excrete (Figure 6). After evacuation of the bowel, the patient may take hot water bath. *Madhutailika vasti*, *bala guduchyadi vasti*, *patolanimbadi vasti*, *vaitarana vasti*, *mustadi yapana vasti*, *tikta kshira vasti* etc are commonly used *vasti* preparations. *Matra vasti* is a type of *sneha vasti* (oil enema) in which medicated oil given in a small dose, and it can be given daily with no risk. *Matra vasti* can be used irrespective of age and not much precautionary measures are required. The usual dosage is 60 ml. For infants the quantity of *matra vasti* is 20 ml [15] (Figure 6).



Figure 6: Matra Vasti.

uttara (enema given through urethra in males and through cervix in females). No other treatment has the capacity to pacify and regulate the force of *vata* apart from *vasti*. *Vasti* is the procedure in which the administered medicine through anal canal reaches up to umbilicus, hips, waists, loins and small intestine, churns the accumulated materials like *dosha* and *purisha* (feces), spread the unctuousness all over the body and easily comes out along

with *purisha* and *dosha* (impurities) [3]. *Vasti* is advised for both children and aged persons, which is excellent both for the elimination of *Doshas* and nourishment of the body. *Vasti* therapy instantaneously promotes *Bala* (strength), *Varna* (complexion), *Harsha* (sense of exhilaration), *Mardavatva* (tenderness) and *Snehana* (unctuousness) of the body [4]. *Vasti* is being the most widely used and highly effective treatment modality for treating neurological disorders. The pharmacodynamic action of *vasti* in alleviating symptoms of neurological manifestation in exact way is still not clearly understood.^[9]

Matravasti (oil enema in small dose) is said to be *Balya* (strengthening), *Brimhana* (nourishing) and *Vatarogahara* (eliminates neurological disorders). *Pakwashaya* (large intestine) is the *moola sthana* (main seat) of *vata dosha*. *Vasti* by its action on the *moola sthana* gets control on *vata* all over the body. Rectum has a rich blood and lymph supply and drugs can cross the rectal mucosa like other lipid membrane and by entering general circulation, *vasti* acts on whole body. *Vasti* may block neuromuscular transmission by binding to receptor sites on motor or sympathetic nerve terminals, entering the nerve terminals, and may inhibit the release of acetylcholine [10]. *Matra vasti* provides more nourishment to deeper *dhatu's* (tissues) [11]. *Vasti* improves fine motor functions, general motor functions like crawling, sitting, standing, walking and clasping hands in CP patients. When compared with internal medicines, *Vasti* has improved fine and gross motor functions in CP cases. *Vasti* found beneficial in spastic diplegia [14].

Sneha vasti improves overall nutrition. *Vasti* is having two actions, expelling the *Dosha* & nourishing the body as it

is indicated in *Gambhiragata vata* (neurological conditions chronic and deep seated) also. Action of *vasti* is related with the facilitation of excretion of morbid substances responsible for the disease process into the colon, from where they are evacuated. *Vasti* drugs in *Pakwashaya* acts on whole body in a same way that of sun, which though placed in the sky, causes evaporation of water on the earth. *Vasti dravya* when administered into rectum may stimulate the sensory system due to its chemical composition and pressure effects over the bowel. As the total nervous system is interrelated, the regular stimulation on enteric nervous system has positive effects over central nervous system also. When *vasti dravyas* are passed through the gastrointestinal tract, it probably stimulates the cells (enterochromaffin cells or entero-endocrine cells) and act as secretogogous thus compensates neurological deficit and improves the functions [12].

Matra vasti (Figure 6) is a sub type of *anuvasana vasti* in which oil or ghee is given by rectal route in a small quantity. When medicated oil reaches rectum and colon, presence of short chain fatty acids in oil allows direct diffusion of drugs from epithelial cells in to capillary blood villi showing its generalized effect [17]. *Shodhana* (detoxification) *karma* is performed mainly by *niruha* or *asthapana basti* (decoction enema) (Figure 5). The protocol is determined according to the disease and the patient's condition [6]. *Vasti* is restricted till the child has attained a crawling age. But *anuvasana vasti* (oil enema) is promoted from early infancy. As far as possible *shodhana* therapies (cleansing and purifying therapy) should be avoided in children [19]. In children compared to *niruha vasti*, *anuvasana* and *matra vasti's* are used commonly in the management of various neurological conditions. By considering all the above facts, *vasti* seems to be beneficial in children with CP.



Figure 7: Case 1 - Improvement in spasticity and deformities.



Figure 8: Case 2 - Improvement in Scissoring phenomenon.



Figure 9: Case 3 - Improvement in Spasticity and Scissoring of legs.



Figure 10: Case 4 - Improvement in Gross motor functions.

According to the authors personal observations (Figures 7-10), *udwartana* brings lightness in the body or limbs and especially useful in flaccidity in CP cases. Whereas procedures like *sarvanga abhyanga*, *baashpa* & *naadi sweda*, SSPS and *matra vasti* are beneficial in reducing the spasticity like scissoring phenomenon, improves mobility or flexibility of joints, improves gross and fine motor functions, and quality of life in children with CP (Figures 7 – 10). *Ayurvedic panchakarma* procedures seem to be efficacious in children with CP.

Conclusion

Various *panchakarma* procedures have proved their efficacy in the management of CP. *Udwartana* opens the minute channels and improves blood as well as lymphatic circulation. *Udwartana* is *kapha*, *vata hara* and removes *aavarana* or *srotorodha*. It provides a platform for further procedures like *abhyanga*, *swedana* and *vasti*. *Sarvanga abhyanga*, *baashpa* & *naadi sweda* reduce spasticity (especially scissoring phenomenon), improves flexibility of joints, improves circulation and reduces pain. *Vasti* is the major treatment for CP and it improves gross as well as fine motor functions, provides nourishment, improves overall general condition and quality of life in children with CP. Further studies on large sample with accurate methodology are required to substantiate these claims.

Acknowledgement

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Conflict of Interest

None.

References

- Bhinde SM (2015) A case study on the Ayurvedic management of cerebral palsy. *Anc Sci Life* 34(3): 167-170.
- Bhinde SM, Patel KS, Kori VK, Rajagopala S (2014) Management of spastic cerebral palsy through multiple Ayurveda treatment modalities. *AYU* 35(4): 462-466.
- Rathia S, Kori VK, Rajagopala S, Patel KS, Chaudhary SA (2015) A clinical study to assess the effect of samvardhana ghrita and yoga basti in cerebral palsy. *Pharma Science Monitor* 6 (4): 108-117.
- Shailaja U, Rao PN, Girish KJ, Raj GA (2014) Clinical study on the efficacy of Rajayapana Basti and Baladi Yoga in motor disabilities of cerebral palsy in children. *AYU* 35(3): 294-299.
- Mamidi P, Gupta K (2015) Ayurvedic management of cerebral palsy: Report of two cases with review of literature. *Int Res J Pharm* 6(1): 73-76.
- Vinjamury SP, Vinjamury M, Sucharitakul S, Ziegler I (2012) Panchakarma: Ayurvedic Detoxification and Allied Therapies-Is There Any Evidence? In: Rastogi S (Eds), *Evidence-Based Practice in Complementary and Alternative Medicine*. Springer, Berlin.
- Vyas AG, Kori VK, Rajagopala S, Patel KS (2013) Etiopathological study on cerebral palsy and its management by Shastika Shali Pinda Sweda and Samvardhana Ghrita. *AYU* 34(1): 56-62.
- Gupta VS, Chavan DB (2017) A single case study on the ayurvedic management of cerebral palsy. *World Journal of Pharmaceutical and Medical Research* 3(2): 186-189.
- Choudhary K R, Kumar A (2014) A Clinical Study to evaluate role of Ayurvedic management for improving activities of daily living in Cerebral palsy affected children. *Int J Ayur Pharma Research* 2(4): 68-82.
- Deepti KA, Munnoli BT, Vijaykumar D, Aziz A, Patil A (2014) Role of Matra Basti (Enema) over Abhyanga (Massage) and Sweda (Sudation) in Reducing Spasticity in Cerebral Palsy with Suddha Bala Taila - A Randomized Comparative Clinical Study. *Int J Ayur. Pharma Research* 2(2): 47-52.
- Sohini S, Anirudhan R (2015) Conventional Ayurvedic Management in Spastic Cerebral Palsy: A Case Study. *Int J Ayur Pharma Research* 5(4): 38-41
- Mudadla S, Injamuri R (2016) Sishunamaka Vasti in the Management of Spastic Cerebral Palsy – A Case Stud. *AYUSHDHARA* 3(1): 519-522.
- Meena MK, Mukhopadhyay B, Singh BM (2016) Role of traditional therapy protocols with Samvardhana Ghrita on language development in Cerebral palsy children. *Int J Ayurveda & Med Sc* 1(3): 56-62.
- Shailaja U, Rao Prasanna N, Arun Raj GR (2013) Clinical study on the efficacy of Samvardhana ghrita orally and by matrabasti in motor disabilities of cerebral palsy in children. *Int J Res Ayurveda Pharm* 4(3): 373-377.
- Harinkhede R, Khandate M, Patle M (2017) Specific therapeutic panchakarma procedure in pediatric patients: A classical review. *Int J Res Ayurveda Pharm* 8(2): 61-67.
- Gavali K, Kumar S (2013) Therapeutic evaluation of ayurvedic therapy on power and spasticity in children effected with cerebral palsy. *Anc Sci Life* 32(Suppl 2): S39.
- Choudhary KR (2014) Recent advances in Ayurvedic management of cerebral palsy affected children. *Int J Res Ayurveda Pharm* 5(6): 642-647.
- Weerakoon S, Amarasinghe AP (2012) Study of the efficacy of an ayurvedic treatment regimen on Balaka pakshaghatha with special reference to cerebral palsy. *Sri Lanka Journal of Indigenous Medicine* 1(2): 55-58.
- Singh K, Verma B (2012) Ayurvedic perspectives towards Cerebral palsy. *J Res Educ Indian Med* 18(3-4): 163-174.
- Kshama Gupta, Prasad Mamidi (2014) Ayurvedic management of lumbar spondylosis with spondylolisthesis: A case report. *J Pharm Sci Innov* 3(6): 533-535.
- Varier PS (2002) Chikitsa Samgraham. Snehnam chapter. (6th edn), Kottakkal: Kottakkal Ayurveda Series 2, India, pp. 132-133.
- Varier PS (2002) Chikitsa Samgraham. Swedanam chapter. (6th edn), Kottakkal: Kottakkal Ayurveda Series 2, India, pp. 188-194.