



Case Study

AYURVEDIC TREATMENT PROTOCOL IN SPASTIC CEREBRAL PALSY

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ABSTRACT

Cerebral palsy is a syndrome of heterogeneous group of condition characterized by permanent, non-progressive dysfunction of motor system arising due to non-progressive insult to developing brain. In India, prevalence of CP is 3/1000 live births. Prime goal of management is improvement in a child's developmental abilities and prevention of secondary impairments. **Patient information:** 7 years old male patient known case of spastic cerebral palsy presenting with symptoms: unable to stand and walk without support, speech delay, tightness of all four limbs and reduced range of motion of joints. **Materials and Methods:** In this study based on the principles of *Vata Vyadhi* and *Avarana Vyadhi Chikitsa - Snehana, Swedana, Srodhosodana* and *Brihmana* was done for 86 days (*Udvardana Abhyanga - Sweda, Basti, Shiropichu, Shirodhara, Pradhamana* and *Pratimarsha Nasya* and *Asyapratisarana* along with physiotherapy). Spasticity assessment by MAS and improvement in range of movement, muscle power by MRC scale, motor development by CDC grading, and quality of life by ADL scale and MACS. **Result:** MAS showed 20-40% improvement. MRC scale had 20% improvement. ADL scale showed 33.33% improvement, MACS scale had 40% improvement, in CDC 16.66%-42.85% degree improvement. Improvement in Range of movement was noted within the range 10.44-86.66%. **Conclusion:** Case study is an attempt to emphasize the effect of an ayurvedic treatment protocol in reducing spasticity and improving the quality of life of a child with spastic cerebral palsy.

INTRODUCTION

Cerebral palsy is the most common cause of chronic motor disability in children. It is described as "syndrome of heterogenous group of condition characterized by permanent, non-progressive dysfunction of motor system arising due to insult to developing brain."^[1] The prevalence of CP is 2.95 children among 1000 live births worldwide.^[2] Males have higher incidence than females. The observed prevalence in India is near to global estimate. The case is of a 7 years old male child with probable etiology as *Bheejadushti* and subsequent *Shiromarmabhighata* and clinical presentations which can be correlated with *Pangu*, *Mookata*, *Jadata*, *Sthabdata*, *Sankocha* and *Spurana*.

Treatment has been planned adopting the principles of *Vata Vyadhi* and *Avarana Vyadhi Chikitsa*.

Patient information

7 years old male child of spastic cerebral palsy complaints of unable to stand and walk without support, poor palmar grip, tightness of all four limbs, poor control over bowel and bladder and speech delay since early childhood. The third child born to 3rd degree consanguineous parents, full term normal vaginal delivery with birth weight of 4kg, cried soon after birth. Child had congenital obstructive hydrocephalus, diagnosed after 1.5 month of age. At the age of 3 months surgical intervention (right side LPVP shunt) was done. Delay in developmental milestones was noticed thereafter, child was under antiepileptic medication after the surgery till 3 years of age, after which they stopped the medicine as per medical advice. From the age of 4 years the child was receiving physiotherapy with no much improvement, so they discontinued the treatment after one year. At the age of 7 years, the child was admitted to the IPD of Kaumarabhriya department of Jamnagar, ITRA.

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Associated complaints

Constipation (once in 3 days, hard consistency, unsatisfactory evacuation) since early childhood.

Perianal itching more during night hours since 2 weeks

Reduced appetite since 2 weeks.

Developmental history

Gross Motor

- Head holding - Attained (2 years)
- Rolling over- Attained (2 years)
- Sit with support- Attained (2 years)
- Sit without support- Attained (5 years)
- Crawling- Attained (3 years)
- Stand with support- Attained (5 years)
- Walk with support- Attained (5.5 years)

Fine motor

- Grasping (palmar)- 21/2 years
- Transfer objects from one hand to another - Attained (3 years)
- Pincer grasp - Not attained

Social development

- Social smile- Attained (6 months)
- Recognizing mother - Attained (6 months)
- Smile at mirror - Attained (1.5 years)
- Waves bye bye - Attained (3 years)
- Play simple ball game - partially achieved

Language

- Monosyllables - Attained (3 years)
- Bi syllables - Attained (5 years)
- Two words with meaning - Attained (5.5 years)
- Simple sentence - Attained (6.5 years)

Immunization history Adequate for the age

Clinical Findings

General and systemic examination

Vision: Normal

Hearing: Normal

Central nervous system (CNS) examination

Higher functions Appearance- normal, Conscious level- good awareness, Emotional state- normal, Gait- scissoring, Intelligence- reduced, Speech- unclear simple sentence.

Cranial nerves - All the nerves are intact

Motor system

The bulk of muscles- wasting present in all upper and lower limb muscles

Tone- Hypertonic, spastic

Power- reduced

Deep tendon reflexes

- exaggerated with well sustained clonus at lower limbs
- brisk in both upper limbs

Lateral column Sensations - sensitive to touch, pain and temperature

Posterior column sensations - unable to do the test

Cerebellar signs - NAD

Signs of Meningeal Irritation - Nil

Rogi Samanya Pariksha

- Nadi - Vathapitha Pradhana
- Mootra -Prakritha
- Mala - Baddham
- Jihwa - Liptam
- Swaram - Aspashtam
- Sparsham - Anushna sitha
- Aakriti - Madyamakrithi
- Drik- Sadaranam

Anthropometry

- Weight - 20 kg
- Height - 113cm
- BMI- 15.7 kg/ m²
- Head circumference - 48 cm
- Chest circumference - 60 cm
- Mid arm circumference 18 cm

Samprapthi

Due to *Bheejadushti* and the subsequent *Shiromarmabhighata*, *Vata Praddhana Tridoshaprakopa* (*Prana, Udana, Vyana, Apana Vayu* along with *Pachaka* and *Sadaka Pitta, Tarpaka Kapha*) and *Stansamsrya* of *Doshas* in *Mastulunga (Snayumoola)*^[3], leading to presentations like *Pangu, Mooka, Jadata, Sthabda, Sankocha* and *Spurana*. In addition *Prakupita Kapha* and *Pitta* cause *Avarana* to *Vata* leading to presentations like *Vaksanga* and *Akshepaka*.^[4]

Laboratory Investigation

MRI Brain- corpus callosum agenesis with interhemispheric cyst, polymicrogyria, thickening and enhancement of falx and pachymeninges.

Routine stool examination revealed the presence of *Enterobius vermicularis*

Urine routine examination was found to be normal

Table 1: Procedure with Timeline

1 st sitting 11/07/24 to 02/08/24		2 nd sitting 15/08/24 - 11/09/24		3 rd sitting 25/09/24 - 25/10/24	
11/07/24 - 15/07/24	<i>Udwartana</i> with <i>Yava</i> and <i>Kulattha Churna</i>	15/08/24 - 17/08/24	<i>Udwartana</i> with <i>Yava</i> and <i>Kulattha Churna</i> <i>Aasyapratisaranam</i> with <i>Triphaladi Churna</i> , <i>Vacha</i> and <i>Madhu</i>	25/09/24- 27/09/24	<i>Udwartana</i> with <i>Yava</i> and <i>Kulattha Churna</i> <i>Triphaladi Churna</i> , <i>Vacha</i> and <i>Madhu</i>
16/07/24 - 22/07/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , <i>Parisheka Sweda</i> with <i>Dasamoola Kwath</i>	18/08/24 - 25/08/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , full body <i>Nadi Sweda</i> , <i>Yoga Basti</i> (<i>Anuvasana</i> with <i>Bala Taila</i> - 48ml, <i>Niruha Basti</i> with <i>Erandamooladi Kwad</i> - 192ml) <i>Aasyapratisaranam</i> with <i>Triphaladi Churna</i> , <i>Vacha</i> and <i>Madhu</i>	28/09/24- 05/10/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , full body <i>Nadi Sweda</i> , <i>Yoga Basti</i> (<i>Anuvasana</i> with <i>Bala Taila</i> - 48ml, <i>Niruha Basti</i> with <i>Erandamooladi Kwad</i> - 192ml) <i>Aasyapratisaranam</i> with <i>Triphaladi Churna</i> , <i>Vacha</i> and <i>Madhu</i>
23/07/24 - 29/07/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , <i>Parisheka Sweda</i> with <i>Dasamoola Kwath</i> , <i>Matra Basti</i> with <i>Bala Taila</i> (24ml)	26/08/24 - 04/09/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , <i>Parisheka Sweda</i> with <i>Dasamoola Kwath</i> , <i>Shiropichu</i> with <i>Dhanwantaram tailam</i> , <i>Salvana Upanaha</i> <i>Aasyapratisaranam</i> with <i>Triphaladi Churna</i> , <i>Vacha</i> and <i>Madhu</i>	06/10/24- 25/10/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , <i>Parisheka Sweda</i> with <i>Dasamoola Kwath</i> , <i>Shirodhara</i> with <i>Dasamoola Ksheerapakam</i> , <i>Salvana Upanaha</i> <i>Aasyapratisaranam</i> with <i>Triphaladi Churna</i> , <i>Vacha</i> and <i>Madhu</i>
30/07/24 - 05/08/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , <i>Shashtika Sali Pinda Sweda</i> at morning, <i>Pratimarsha Nasya</i> with <i>Panchendriyavardhana Taila</i> at evening	05/09/24 - 11/09/24	<i>Sarvanga</i> <i>Abhyanga</i> with <i>Prasarinyadi Taila</i> , <i>Parisheka Sweda</i> with <i>Dasamoola Kwath</i> , <i>Pradhamana Nasya</i> with <i>Shunti Churna</i> at morning and <i>Pratimarsha Nasya</i> with <i>Panchendriyavardhana Taila</i> at evening <i>Aasyapratisaranam</i> with <i>Triphaladi Churna</i> , <i>Vacha</i> and <i>Madhu</i>		
26 days		28 days		32 days	

Internal medicine

1. *Higuvashtak churna* 2gm + *Vidanga Churna* 500 mg BD with Buttermilk 20 mins before food.
2. *Brahmi Churna* (1gm) + *Sankhupushpi Churna* (1gm) + *Guduchi Churna* (1gm) + *Yashtimadhu Churna* (500mg) + *Vacha Churna* (500mg) + *Pippali Churna* (100 mg)- BD with Ghee and Madhu after food.
3. *Eranda Taila* 5ml with lukewarm water at bed time for the initial 1 week.

OBSERVATION**Table 2: Modified Ashworth scale (MAS): Degree of muscle tone**

S.no	Group of muscle		Before treatment	After 1 st sitting	After 2 nd sitting	After 3 rd sitting	% improvement
1.	Elbow						
	Flexors	Right	3	3	2	2	20%
		Left	3	3	2	2	20%
	Extensors	Right	3	3	3	2	20%
		Left	3	3	2	1	40%
2.	Wrist						
	Flexors	Right	4	4	3	2	40%
		Left	4	4	3	2	40%
	Extensors	Right	3	3	2	2	20%
		Left	3	3	2	1	40%
3.	Knee						
	Flexors	Right	4	4	3	3	20%
		Left	4	4	3	3	20%
	Extensors	Right	5	5	4	3	40%
		Left	5	5	4	3	40%
4.	Ankle						
	Dorsi -flexors	Right	4	4	3	3	20%
		Left	3	3	2	2	20%
	Plantar flexors	Right	4	4	3	3	20%
		Left	4	3	3	3	20%

Table 3: MRC scale: Degree of muscle power

S.No	Group of muscle		Before treatment	After 1 st sitting	After 2 nd sitting	After 3 rd sitting	% improvement
1	Biceps (elbow flexor)	Right	4	4	5	5	20%
		Left	4	4	4	5	20%
2	Quadriceps (knee extensor)	Right	3	3	4	4	20%
		Left	3	3	3	4	20%

Table 4: Manual Ability Classification System (MACS)

S.No	Side	Before treatment	After 1 st sitting	After 2 nd sitting	After 3 rd sitting	% improvement
1	Right	4	3	2	2	40%
2	Left	4	3	3	2	40%

Table 5: ADL (Activities of daily living): Quality of life

Sr.no.	ADL (Activities of daily living)	Before treatment	After 1 st sitting	After 2 nd sitting	After 3 rd sitting	% improvement
	Bowel					33.33%
Grade 0	Incontinent	✓	✓	✓		
Grade 1	Occasional accident (1 week)				✓	

Grade 2	Continent					
	Bladder					33.33%
Grade 0	Incontinent	✓	✓	✓		
Grade 1	Occasional accident				✓	
Grade 2	Continent					
	Grooming					0
Grade 0	Needs help	✓	✓	✓	✓	
Grade 1	Independent face, hair, teeth, shaving					
	Toilet use					33.33%
Grade 0	Dependent	✓	✓			
Grade 1	Needs some help but can do something			✓	✓	
Grade 2	Independent (on and off, dressing, wiping)					
	Feeding					33.33%
Grade 0	Unable	✓	✓	✓		
Grade 1	Needs help cutting, spreading butter etc				✓	
Grade 2	Independent					
	Transfer					33.33%
Grade 0	Unable					
Grade 1	Major help	✓	✓	✓		
Grade 2	Minor help				✓	
	Mobility					0
Grade 0	Immobile					
Grade 1	Wheelchair independent including corners					
Grade 2	Walk with help of 1 person	✓	✓	✓	✓	
Grade 3	Independent					
	Dressing					33.33%
Grade 0	Dependent	✓	✓	✓		
Grade 1	Need help				✓	
Grade 2	Independent					
	Stairs					0
Grade 0	Unable					
Grade 1	Need help	✓	✓	✓	✓	
Grade 2	Independent					
	Bathing					0
Grade 0	Dependent	✓	✓	✓	✓	
Grade 1	Independent					

Table 6: CDC grading for motor milestones

Gross Motor						
	Head Holding	Before treatment	After 1st sitting	After 2nd sitting	After 3rd sitting	% improvement
Grade 1	Head balanced always	✓	✓	✓	✓	0
Grade 2	Holds head steady when moved around					
Grade 3	Prone elevates self by arms and chest					
Grade 4	Supine lifts head when pulled up by arms					
Grade 5	Head erect and steady momentarily					
Grade 6	No head holding at all					
	Sitting					0
Grade 1	Raises self to sitting position	✓	✓	✓	✓	
Grade 2	While sitting, can manipulate a toy					
Grade 3	Sits with the child's back straight					
Grade 4	Sits 30 seconds or more leaning forward					
Grade 5	Sits momentarily					
Grade 6	Not sitting at all					
	Standing					42.85%
Grade 1	Take a few steps without support.				✓	
Grade 2	Stands up, all by himself by throwing weight on arms			✓		
Grade 3	Without support, can stand alone		✓			
Grade 4	Takes a few steps, both hands hold	✓				
Grade 5	Stands holding furniture momentarily					
Grade 6	Does not stand at all					
	Fine Motor					28.57%
Grade 1	Uses end of thumb and index finger / Neat pincer grasp				✓	
Grade 2	Uses thumb and index finger and holds small object			✓		
Grade 3	Transfer object from one hand to another hand	✓	✓			
Grade 4	Try to reach and holds things with good grip					
Grade 5	Try to reach and holds thing with crude method					
Grade 6	No grasping at all / absent palmer grasp					

	Language					
Grade 1	Makes simple sentence			✓	✓	16.66%
Grade 2	Two words with meaning	✓	✓			
Grade 3	Bi-syllables					
Grade 4	Monosyllables					
Grade 5	Marked cooing					
Grade 6	Unable to speak or produce sound at all					
	Personal and Social					
Grade1	Mimicry, understand spoken words and responds in appropriate manner	✓	✓	✓	✓	0
Grade2	Resist if toy is pulled					
Grade3	Attracts towards toy and displeasure on taking it away					
Grade4	Anxiety to stranger					
Grade5	Recognizing mother					
Grade 6	Social smile and recognition					

Table 7: Range of motion: measured using Goniometer

Joint/ Segment	Movement	Normal ROM (In degree)		Before treatment	After 1 st sitting	After 2 nd sitting	After 3 rd sitting	% improvement
Elbow	Flexion	140	Rt	100	100	115	120	20%
			Lt	100	100	115	120	20%
	Extension	180	Rt	120	120	130	150	25%
			Lt	120	125	130	155	29.166%
Wrist	Extension (Dorsiflexion)	60	Rt	40	45	45	55	37.5%
			Lt	40	45	55	58	45%
	Flexion (Palmer Flexion)	60	Rt	40	45	45	55	37.5%
			Lt	40	45	55	58	45%
	Radial Deviation	20	Rt	15	15	15	18	20%
			Lt	15	15	18	18	20%
	Ulnar Deviation	30	Rt	15	18	25	28	86.66%
			Lt	15	18	25	25	66.66%
Knee	Flexion	150	Rt	120	128	130	135	12.5%
			Lt	125	130	130	138	10.4%
	Extension	180	Rt	135	138	145	150	11.11%
			Lt	135	138	145	150	11.11%
Ankle	Planter flexion	20	Rt	15	15	15	18	20%
			Lt	15	15	18	18	20%
	Dorsiflexion	30	Rt	15	18	25	28	86.66%
			Lt	15	15	15	18	20%

Table 8: Improvement in clinical subjective symptoms

Before treatment	After treatment
Constipation	Resolved after 1 week
Perianal itching	Symptomatic relief within 1 week
Reduced appetite	Improvement within 2 weeks

RESULT

Improvement in tone of muscle: initially bilateral elbow flexors and extensors, bilateral wrist extensors and left ankle dorsiflexors had marked increase in muscle tone through most of the range of movement after treatment in bilateral elbow flexors, right elbow extensor, right wrist extensor and left ankle dorsiflexor the tone reduced so that there was an initial catch followed by minimal resistance throughout the remaining range of motion. In left elbow and wrist extensor there was only a catch when starting a movement.

In bilateral wrist, knee and ankle plantar flexors and right ankle dorsiflexors passive movement was difficult initially which after treatment can be moved easily with resistance throughout the range of motion.

Improvement in muscle power: initially child was able to move the upper limbs against some resistance applied by the examiner and after second sitting itself improvement was noted and after 3 sitting both sides acquired normal power. Child was able to move the legs against gravity initially which was improved to moving against little resistance.

Improvement in quality of life: initially child was only able to handle limited selection of easily manageable objects in adapted situation (balls, hold a pen when placed in hand with palmar grasp) the scale showed improvement after the first sitting itself and at the end of treatment child was able to handle most of the objects but with reduced quality (able to hold pen with improved grasp, developed pincer grasp). Complete bowel and bladder incontinence was improved to reduced frequency of such incidence. Initially child was completely depended for toilet using, feeding, dressing but now the child participates in these activities and can do it with the help of mother. Before treatment transfer of objects from one hand to another required major help but after last sitting it is found that only minor help is required.

DISCUSSION

- *Hinguvashataka Churna* along with *Vidanga Churna*. The majority of ingredients of *Hinguvashataka Churna* are *Katu Rasa*, *Katu Vipaka* and *Ushna Veerya* may have promoted effect on the *Deeptavasta* of *Jadaragni*, acts as digestive stimulant by various enzymatic secretions, piperine, ginger, asafoetida, and ajowan significantly increase lipase activity. Pancreatic amylase activity is elevated by dietary ginger and piperine dietary asafoetida, and cumin also significantly enhanced the activity of pancreatic amylase^[5]. Embilin in *Vidanga Churna* has *Krimihara* property, this may have worked on the complaint of perianal itching

- *Medhya Churna*, herbal nootropics might boost memory, concentration, and cognitive skills. They enhance brain circulation, regulate neurotransmitters, reduce inflammation, foster new brain cells, and shield against free radicals, promoting mental performance.^[6]
- *Udwartana* with its *Kaphavata Haratwa* removes *Avarana* or *Srotorodha*.
- *Abhyanga (Prasarinyadi Taila)* followed by *Udwartana* helps in attaining *Snehana* easily. *Prasarinyadi taila* is *Vatasleshma Hara*, and is indicated in *Kubja*, *Stimitha*, *Pangutwa*, *Ardita*, *Hanu Prishta Shiro Greeva Sthamba*.
- *Parisheka Sweda (Dasamoola Kwatha)*- Eventhough *Parisheka Sweda* is *Pittasamaka* doing it with *Dasamoola* helps us to attain *Tridosahartwa*.^[8]
- *Upanaha (Godhumadi Churna and Bala Taila)*- *Bandhana* promotes increased contact time with the affected part, kept in anatomical position, helping the management of spasticity and contracture. Along with that majority of drugs have *Vatakapha Hara Guna*, thus helps to reduce *Stambha* and *Sankocha*.^[9]
- *Shastika Sali Pinda Sweda* by virtue of its *Anulomana*, *Balapushtikara*, *Srothosuddhikara* *Gunas* are indicated in conditions *Ayama*, *Akshepaka*, *Sthamba*, *Sankocha*, *Pakshaghata*, *Sarvanga Vata Vikara*, *Karsya* etc so we have deployed the same in this case.^[10]
- *Basti – Snehabasti (Bala Taila)* due to its *Snighdata* and *Vatahatwa* helps to attain *Koshta Snigdada*. *Niruhabasti (Erandamooladi Kwath)* most of the contents are *Vatakaphahara*. Rectum is rich supply of blood and lymph supply, thus drugs which are fat soluble will be absorbed faster. The concept of Enteric Nervous System explains the stimulation of CNS through *Basti*.^[11]
- *Pradhamana* with *Shunti Churna*^[12] works by its *Srotosodhana Karma* thus increases the absorption of *Panchendriyavardhana Taila*.
- *Pratimarsha Nasya (Panchendriyavardhana Taila)* might have a positive impact in improving speech and cognition, due to its effect in *Vagdwamsa Mookata*, *Indriya Prasadana*, *Smriti* and *Medha*. And its *Balya* nature and effectiveness in conditions like *Ardita*, *Hansusandamsa* might have played a role in spasticity.^[13]
- *Shiropichu* with *Dhanwantaram Taila*-As *Shirogata Majja* is affected in this condition, *Sthanika Snehana Karmas* with *Dhanwantaram Taila* specifically indicated in *Vata Rogas* with *Majja Dhatu* involvement might have helped in improving

the cognition, speech and fine motor development^[14].

- *Shirodhara* with *Dasamoola Kwath* helps in the relaxation of nerve fibers that are involved in the continuous contraction of the myofibrils, thereby relaxing the affected part of the body. The effect of *Shirodhara* is enhanced by the hollow sinuses in the frontal region. In the procedure of *Shirodhara*, particular pressure and vibration may get created over the forehead. These vibrations may get amplified by the hollow sinus present in the frontal bone. These may then be transmitted inwards through the fluid medium of cerebrospinal fluid (CSF). This vibration, along with a mildly increased temperature, may stimulate the higher centers in a positive way.^[15]
- *Asyapratisharana- Yashtimadhu* in *Triphaladi Churna* and *Vacha* helps to improve speech and is *Medhya*, *Triphala* has *Rasayana Guna*, so the combination might have a positive effect in stimulating the higher center and improving speech.

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