

## MANAGEMENT OF GLOBAL DEVELOPMENTAL DELAY THROUGH AYURVEDA: A CASE STUDY

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### ABSTRACT

Global Developmental Delay (GDD) is defined as a significant delay in two or more developmental domains. The prevalence being 1-3% in developing countries. there are many etiological factors like genetic and environmental which can cause GDD. GDD has also show certain changes in behaviour like impulsivity, lack of socialisation of a child which affects the whole family. The contemporary management includes v therapies like physiotherapy and speech therapy along with modification in nutritional. In the view of Ayurveda, GDD mainly involves the Vata dosha which regulates the whole process of growth and development. When Vata affects the whole body, it is called as 'Sarvanga Vata'. The present study of four and half year old male child, who was unable to stand and walk without support, delay in speech as per age and lack of socialisation since age appropriate. The management included a set of external Ayurveda therapies and oral

medications along with physiotherapy which were given for a period of 6 months. The major herbal ingredients of oral medications included *Bacopa monnieri*, *Pipper longum*, *Operculum turpetum Linn.*etc which are proven to have anti-inflammatory, increases the enzymatic activity, Antioxidant and overall immunity of the body. Significant improvement was seen in the Gross motor, Fine Motor, Language and communication activities along with certain changes in behaviour and emotional parameters. Noticeable changes were seen within 2 months and significant changes was seen by the end of 4<sup>th</sup> month. The changes were assessed at regular intervals based on the standard tools and anthropometrical measurements, along

with activities of daily living. This case study gives us an insight that through the comprehensive approach, there could be a considerable improvement in the presenting features in children with GDD and in improving their quality of life.

**KEYWORDS:** *Vata Dosha* (Nervous system), *Sarvanga Vata* (Whole body afflicted by Vata), Behavioural changes, Quality of life in children.

## INTRODUCTION

Global developmental delay (GDD) is defined as evidence of significant delays in two or more developmental domains, including motor skills, speech and language, cognition, social/personal development and activities of daily living.<sup>[1]</sup> As of the available statistics, the prevalence of GDD in India stands as 1-3% under the children of 5 years (APA).<sup>[2]</sup> Being a multifactorial pathology which include genetic causes, prenatal and natal insult to the child and various other environmental factors.<sup>[3]</sup> the most common cause is identified as perinatal Asphyxia and HIE (Hypoxic ischaemic Encephalopathy).<sup>[4]</sup> The children with GDD exhibit some behavioural symptoms also like temper tantrums, aggression and hyperactivity.<sup>[5]</sup> The common co-morbidities of GDD include Epilepsy, visual deficits, hearing impairment, learning issues, Cerebral palsy and Sleep disturbances.<sup>[6]</sup> The management include various therapies like physiotherapy, occupational and speech therapies along with optimum nutrition, early learning methods, responsive parenting, safety and security.

Based on the symptoms, the disease can be correlated to *Sarvanga Vata*<sup>[7]</sup> (Vata dosha afflicting the whole body). *Vata* is important for motor and sensory functions in the body. Vata is one of the Fundamental element for the functioning of the body whose major function is linked with normal physiology of central nervous system. It controls rest of the *Dosha*, *Dushya* and *Mala*. If *Vata* is vitiated then the normal functions of Vata like locomotion, speech, cognition etc will be impaired and diseases like Hemiplegia, Quadriplegia, Arthritis etc can be caused. The major causes are regular intake of dry, processed, cold food items, exposure to more breeze and sunlight, more exertion etc. The diseases of Vata is of 2 days namely Kevala Vata janya (Only of Vata origin) and *Margavarana* (Obstruction) Sarvanga Vata affects the whole body, it is a *Kevala Vata Vyadhi* due to *Prakopa* (Aggravation) of *Vata*; It affects *Sira* (Blood vessels) and *Snayu* (Ligament) because of which the locomotor functions are impaired, the *Vata* which is the prime one in controlling the other *Dosha* and *Dhatu* should be maintained in normalcy for which *Vatahara Chikitsa* (Which pacify Vata) is

prime line of treatment. Which includes Snehana (Oleation both internal and external), Swedana (Sudation) and Basti (Enema).<sup>[8]</sup>

### Patient information

A male child aged four and half years, came with the complaints of unable to stand and walk without support, unable to hold objects in the hands and delay in speech since age appropriate. Associated with abnormal body movements and dribbling of saliva since two years.

History suggests that child was normal till seven months of age, after which they observed that the he was not able to sit with support even after eight months. They didn't consult any doctor and later the child was not able to stand and walk without support even after 1 and half years of age. The child was not able to speak as per age for which they consulted a pediatrician, Audiometry report was said to be normal and they advised physiotherapy and Speech therapy, after which they found a little improvement.

Antenatal history reveals that it was Spontaneous conception, Mother's age was 26years with G1P1A0L0, there was no history of any Infection and hospital admission during pregnancy. There was Hyperemesis gravidarum till 7 months of pregnancy. And Pregnancy Induced Hypertension in 8<sup>th</sup> month and was on medication along with supplements like Folic Acid, Iron and Calcium on regular basis and 2 doses of TT injection. Antenatal scans were normal. The Natal history reveals that the child was Full term and delivered through LSCS as there was 2 loops of umbilical cord coiled around the neck. Baby did not cry immediately after birth and was shifted to NICU. Birth weight was 2.3 Kg. during Post Natal period Breast feeding was not started immediately after birth, baby was on formula feeds, NICU stay for 4 days, the documents or information regarding this was not available with the parents, H/o Neonatal Jaundice on 3<sup>rd</sup> day and was managed with double surface phototherapy for 48 hours, no H/o Convulsions or Neonatal Septicemia.

In family history the child was of the Non Consanguineous marriage. All the other family members are said to be healthy and they belong to lower middle class family. Child was immunised as per the schedule.

In Personal history appetite was reduced, regular intake of biscuit with milk. Bowel was irregular. Sleep and micturition were normal.

**Table No. 1: Details of gross motor milestones.**

Milestones	Appropriate age to attain	Attained age
Neck holding	3 months	4 months
Rolls over	4 months	7 months
Sitting with support	6 months	9 months
Sitting without support	7 months	12 months
Standing with support	9 months	18 months
Standing without support	10 months	Not yet attained
Walking with support	11 months	Not yet attained

**Table No. 2: Details of fine motor milestones.**

Milestones	Appropriate age to attain	Attained age
Bidextrous Reach	4 months	8 months
Monodextrous Reach	6 months	1 year
Immature pincer grasp	9 months	18 months
Mature pincer grasp	12 months	Not attained
Imitates scribbling	15 months	2 years
Vertical and circular strokes	2 years	4 years
Copies circle	3 years	Not attained
Copies cross	4 years	Not attained
Copies triangle	5 years	Not attained

**Table No. 3: Details of language and communication milestones.**

Milestones	Appropriate age to attain	Attained age
Alerts to sound	1 months	2 months
Cooing sound	3 months	3 months
Monosyllables	6 months	9 months
Bisyllables	9 months	2 years
1-2 words with meaning	12 months	Not attained
2-3 words sentence	2 years	Not attained

**Table No. 4: Details of social behaviour milestone.**

Milestones	Appropriate age to attain	Attained age
Social smile	2 months	2 months
Recognises mother	3 months	6 months
Recognises stranger	6 months	1 year
Waves bye bye	9 months	Not attained
Comes when called	12 months	Not attained

In General examination pallor was present, with weight and height of 14kg and 119cm respectively. All vitals were stable. Head to toe examination were found to be normal. Systemic examination includes CNS: Conscious and well oriented to place and person but not with time, HMF – not intact with respect to speech. Cranial nerves were intact. In Motor system examination: there was muscle wasting in both the lower limbs, muscle tone was

hypertonic and spasticity was present in all the four limbs. Muscle power in both the upper limbs are 3/5 and lower limbs are 2/5. Deep tendon reflexes were exaggerated and positive Babinski sign. Other systemic examination were said to be normal.

**Diagnosis:** *Sarvanga Vata* (Global Developmental Delay).

#### ❖ Treatment given

**Table no. 5: Details of oral medication.**

<i>Medicine</i>	<i>Dose and administration route</i>	<i>Action</i>
<i>Ashtachurna</i>	5ml twice a day with water orally Before food	<i>Deepana</i>
<i>Ashwagandha Arishta + Bala Arishta</i>	2.5ml + 2.5ml twice a day orally with water After food	<i>Balya Vatahara</i>
<i>Ksheera bala 101 drops</i>	3 drops twice a day with Milk After food	<i>Balya Vatahara</i>
<i>Samvardhana Ghrita</i>	2.5ml twice a day with Luke warm water orally Before food	<i>Angavardhana Vak pravruthi Sroto Shodhana</i>

**Table no. 6: Details of therapeutic procedure during 1<sup>st</sup> admission.**

<b>Sl. no.</b>	<b>Therapy</b>	<b>Medicine used for therapy</b>	<b>Duration</b>
1	<i>Sarvanga Udwarthana</i>	<i>Triphala Churna</i>	2days
2	<i>Sarvanga Abyanga</i>	<i>Ashwagandha Balalakshadi taila + MahaMasha</i>	3days
3	<i>Matra Basti</i>	<i>Samvardhana Ghrita(15ml) + Sahacharadi Taila (15ml)</i>	14 days
4	<i>Pizhichil</i>	<i>Ashwagandha Bala Lakshadi Taila+Mahanarayana Taila</i>	4 days
5	<i>Vestana</i>	<i>Mahamasha Taila</i> for both upper and lower limbs	14 days
6	<i>Sarvanaga Shastika Shaali Pinda Sweda</i>	<i>Ashwagandha Bala Lakshadi Taila</i>	5 days
7	Physiotherapy	For one hour everyday	14 days

**Table no. 7: Details of therapeutic procedure during 2<sup>nd</sup> admission.**

<b>Sl. no.</b>	<b>Therapy</b>	<b>Medicine used for the therapy</b>	<b>Duration</b>
1	<i>Sarvanga Abyanga</i>	<i>Mahanarayana Taila+Mahamasha Taila</i> followed by <i>Nadi Sweda</i>	5 days
2	<i>Sarvanga Shastika Shali Pinda Sweda</i>	<i>Ashwagandha Lakshadi Taila</i>	5 days
3	<i>Vestana</i>	<i>Maha Masha Taila</i> for both the lower limbs	14 days
4	<i>Pizhichil</i>	<i>Maha Narayana Taila + Ashwagandha Bala Lakshadi Taila</i>	5 days
5	<i>Yoga Basti</i>	<i>Anuvasana Basti with Sahacharadi</i>	8days

		<i>taila(15ml) + Samvardhana Ghrita(15ml) and Niruha Basti (150ml) with Mustadi Yapana Basti.</i>	
6	Physiotherapy	1 hour	14 days

### ❖ OBSERVATION AND RESULTS

Before and after treatment various subjective and objective parameters. Subjective was assessed by observation and considering parents's words and objective evaluations were done using GMFC scale for assessing Gross motor functional capacity, Modified Ashworth scale to assess the muscle tone, Medical Research Council Scale to assess Muscle power, Spasm frequency scale to assess Spasticity, Manual ability classification system to assess manual activities of the child, Range of movement (ROM) is assessed using Goniometer and Activities of Daily Living (ADL).

**Table No. 7: Details of changes Before and After treatment.**

Before treatment	After treatment
Unable to stand and walk without support	Is able to stand and walk with single finger support
Appetite: Reduced Sleep: Normal Bowel: Once in 2-3 days Dribbling of saliva: Present ++	Appetite: Improved Sleep: Improved Bowel: Regular (once a day) Dribbling of saliva: Present + (comparatively reduced)
Weight :14kg MAC:13cm (R and L) MTC:21cm (R and L)	Weight: 16 kg MAC: 14cm (R and L) MTC:23cm (R and L)
Muscle power (Medical Research Council Scale) UL 3/5(R and L) LL: 2/5(R and L) Muscle tone (Modified Ashworth scale): Hypertonic, Spasticity present	UL- 3/5(R and L) LL: 3/5(R and L) Spasticity is reduced to 20% as per the informant.
ROM with goniometer Elbow flexion- 100 degree Knee flexion -80 degree Plantar flexion -20 degree	Elbow flexion- 120 degree Knee flexion -90 degree Plantar flexion- 25 degree
Modified Ashworth scale: Score 2 (R and L)	Score 1 (R and L)
Spasm frequency scale : Score 3	Score 2
Manual Ability classification system (MACS): Level 3	Level 2

### DISCUSSION

GDD & Sarvanga vata: GDD is diagnosed in less than 5 years old, if there is delay in more than two domains of development. Early diagnosis is critical as it allows timely initiation of



casual treatment, prevention of complications etc. The treatment consist of Physiotherapy, Speech therapy, Occupational therapy and Nutrition based diet modification. The symptoms of GDD can be corelated to Sarvanga Vata in Ayurveda, as the entire body is involved in the pathogenesis of causing the disease like there is karma Kshaya of the four limbs, wasting of muscles etc. The treatment for Sarvanga Vata is Vata hara line of management which includes Shodhana (Eliminatory procedure) like *Basti(Enema)*, Shamana Aushadhi (Palliative medicine) which does Nourishment to the muscle tissue and Rasayana (Rejuvenation therapy) to improve the growth of the muscles and does Immune modulation.

In this case, A set of treatment was planned accordingly which includes *Udwarthana (Powder massage)*, *Abyanga (Oil massage)*, *Basti*, *Shastika Shali Pinda Sweda (Massage with boiled rice cooked with milk)* and *Vestana (Bandage)* along with Physiotherapy.

#### Mode of action of *shamana aushadi*

- ***Ashta churna:*** Contains *Shunti*, *Pippali*, *Hingu* which helps in *Agni Deepana (Digestive)* and *Ama Pachana (Carminative)*, where *Mandha Agni* (Decreased metabolism) is the cause for all disease and the prime treatment should start from correcting the *Agni* (Digestive fire) which in turn nourishes all the other *Dhatu (Tissue)*.
- ***Bala arishta:*** Contains *Bala*, *Ashwagandha*, *Swadamstra* etc which is strength promoting by nature, which gives strength for the limbs and increases the muscle strength and bulk.
- ***Ksheera bala 101 avarthi:*** Contains *Goksheera*, *Bala kwatha* etc which is the good source of protein which help in the formation of the muscle bulk and *Bala (Strength)* helps in improving the strength and reduces the Vata and brings it to normalcy.
- ***Samvardhana ghrita:*** It is special contribution By Acharya Kashyapa, it helps in improving locomotory function, speech etc it consist of *Bala*, *Atibala* which increases the strength of all the muscles and *Lavana* helps in reducing the *Abhishyandha Guna (Excess lubrication)* as it does *Sroto Shodhana* (Cleaning of all the channels).<sup>[9]</sup>
- ***Ashwaganda arishta:*** Contains *Ashwagandha*, *Haridra*, *Haritaki*, *Musta* etc, it increases the strength of the muscles and overall body.

- **Sarvanga udwarthana:** *Udwarthana* is done to reduce the *Shakagata Ama*; *Koshtagata Ama* is reduced by using *Deepana-Pachana* Dravya, but *Ama* in *Shaka* is reduced through *Udwarthana* and it also helps in better absorption of oil while doing *Abhyanga*.
- **Sarvanga abyanga:** *Abyanga* increases strength, Mobility, Flexibility and Memory, it is indicated in *Vata* disorders which reduces the Spasticity in both the upper and lower limbs which is because of *Mandha* and *Guru Guna* of *Kapha Dosha* so *Abyanga* which is done with *Taila* increases the *Chala Guna* of *Vata* and thereby reducing the spasticity and also reduces the deformation of limbs. It increases the Peripheral and local blood circulation, Lymphatic Drainage by increasing the oxygenated blood and Nutrients which reduces the Muscle fatigue and Soreness; It removes the toxins present in the skin which in turn reduces the Tightness and Stiffness of the Muscle.<sup>[10]</sup>
- **Matra basti:** Is usually preferred in children as the dose is minimal and Basti is indicated from the age of 1 month as per Acharya Charaka. *Sahacharadi Taila* is *Vatahara* in action and the main cause for *Samvardhana Vikara* is *Vata*, *Samvardhana ghrita* is indicated in Motor disorder, Speech delay and overall development of the Sharira, the main reason for using *Yamaka Sneha* is because of its dual action of *Taila* and *Ghrita*.
- **Shastika shali pinda sweda:** The fomentation done using *Shastika Shali* will help in opening the pores of the skin and helps to increase the permeability for better absorption of oil; it also increases the blood circulation by dilation of blood vessels and helps in rejuvenating the muscle tissue.<sup>[11]</sup>
- **Mustadi yapana basti:** The effects of this *Basti* are *Balya*<sup>[12]</sup> (Strength promoting) and Sanjeevan (Which will increase the life span), *Yapana Basti* is having the qualities of both *Niruha* and *Anuvasana Basti*, it is *Mrudu* in Nature which is easily administered in children.
- *Pizhichil* is the procedure where oil is poured and simultaneously massage is done, there is dual action of both *Abhyanga* and *Seka* which increases Muscle tone and muscle strength and the oil which was used will increase the muscle bulk and has *Vatahara* property.



- **Vestana:** It is one of the *Vata Upkrama*, in which the a cloth is dipped in oil and rolled around both upper and lower limbs, it helps to reduce the deformity of the limbs, and reduce spasticity.
- **Physiotherapy:** The exercise will increase the blood circulation and strengthens the limbs and reduces the spasticity of the limbs and will help in preventing the contractures.<sup>[13]</sup>

## ❖ CONCLUSION

*Vata Dosha* is the important factor for the proper functioning of Motor and Sensory system, if *Vata* is not in Normalcy then various diseases/abnormalities like Developmental delay, Motor disability, Myopathies, Speech disorder etc can occur. *Vata* should be managed and maintained in normalcy so that all the other *Dosha* and *Dhatu* will function properly. Here in GDD the reason is *Vata Prakopa* because of the *Avarana* by *Kapha*, so the *Chikitsa* should be focused on *Avarana Nashaka*, *Vata Shamana* and *Brimhana*. Hence, the comprehensive management with Ayurveda, Speech therapy and Physiotherapy the Quality of life Parameters can be improved in conditions like GDD.

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