



An Ayurvedic Approach Of Developmental Delay In Children: A Review Article

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ABSTRACT

Developmental delay (DD) is characterised by significant lag in achieving age- appropriate milestones in motor, cognitive, speech- language, and social domains. Globally, 5–15% of children are affected. Ayurveda describes childhood growth and development under the concept of Samvardhana (physiological growth and maturation), and disturbances therein may be conceptualised as Samvardhana Janya Vikara. To review developmental delay from modern and Ayurvedic perspectives, correlate it with Samvardhana Janya Vikara, and summarise diagnostic and therapeutic approaches including Panchakarma and Rasayana therapy. Ayurvedic management includes Medhya Rasayana, Ghrita preparations, Nasya, Abhyanga, Shirodhara, nutritional modulation. Ayurveda provides a holistic and individualised framework for understanding developmental delay. Integrative approaches combining early stimulation and Ayurvedic therapeutics may improve outcomes.

Keywords: Developmental Delay, Samvardhana Janya Vikara, Balrog, Medhya Rasayana, Panchakarma

INTRODUCTION

Developmental delay (DD) refers to significant delay in one or more developmental domains compared to age-matched peers¹. Global prevalence ranges between 5-15%². Causes include genetic abnormalities, perinatal insults, malnutrition, infections, and environmental deprivation³. In Ayurveda, childhood growth (Vridhhi) and development (Samvardhana) are governed by proper functioning of Agni, Dhatu Poshana, Ojas, and balanced Doshas⁴. Disturbances in these processes lead to disorders collectively conceptualised as Samvardhana Janya Vikara, which include impaired physical, intellectual, and behavioural maturation⁵

MATERIALS AND METHODS

Classical Ayurvedic Sources - Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Kashyapa Samhita

Modern Databases - PubMed, Scopus, Google Scholar using keywords: "Developmental delay", "Ayurveda", "Medhya Rasayana", "Panchakarma in neurodevelopment", "Samvardhana Janya Vikara".

Inclusion Criteria - Peer-reviewed articles, Ayurvedic conceptual or clinical studies

CAUSES OF DEVELOPMENTAL DELAY

PRENATAL CAUSES	PERINATAL CAUSES	POSTNATAL CAUSES
Genetic abnormalities (Down syndrome, Fragile X syndrome, metabolic disorders)	Birth asphyxia	Neonatal infections (Meningitis, Encephalitis)
Congenital brain malformations	Hypoxic–Ischemic Encephalopathy (HIE) ⁶	Traumatic brain injury
Intrauterine infections (TORCH – Toxoplasmosis, Rubella, CMV, Herpes)	Prematurity ⁷	Severe neonatal jaundice (Kernicterus)
Maternal malnutrition	Low birth weight	Seizure disorders
Maternal anaemia	Intracranial hemorrhage	Chronic malnutrition
Maternal diabetes / thyroid disorders	Prolonged labor	Environmental deprivation / neglect
Exposure to toxins (alcohol, drugs, radiation)	Meconium aspiration	Lead poisoning / toxin exposure
Placental insufficiency	Neonatal sepsis	Chronic systemic illness
Intrauterine growth restriction (IUGR)	Instrumental delivery complications	Autism spectrum disorder / ADHD ⁸
Maternal infections during pregnancy	Birth trauma	Endocrine disorders (e.g., hypothyroidism)

In Ayurveda, the major causative factors are described as follows:

Beeja Dushti : Acharya Charaka describes that defects in Beeja (sperm and ovum) lead to congenital abnormalities and developmental disorders. Vitiating of Shukra and Artava at the time of conception may result in structural and functional defects in the offspring⁹.

Dauhridavamaana : Improper maternal diet and failure to fulfill Dauhrida (maternal cravings reflecting fetal needs) may impair fetal growth and organ development. Kashyapa¹⁰ and Charaka¹¹ emphasise the importance of proper antenatal nutrition for optimal fetal brain development. Deficiency in maternal nutrition may lead to Garbhakshaya, low birth weight, and delayed milestones.

Garbhopaghata Kara Bhava : Acharya Sushruta described factors harmful to the foetus under Garbhopaghata Kara Bhava, which include intake of incompatible food, excessive exertion, trauma, toxins, infections, and psychological stress during pregnancy¹².

Vata Prakopa : Vata Dosha governs neuromotor functions, sensory perception, speech, and cognition. Aggravation of Prana and Udana Vata during fetal or postnatal life may impair neuronal maturation,

leading to delayed motor and speech milestones. Since Vata is responsible for all neurological activities, its vitiation plays a central role in developmental delay¹³

Agni Mandya : Agni is responsible for digestion and tissue nourishment (Dhatu Poshana). Weak digestive and metabolic fire leads to improper formation of successive Dhatus, including Majja Dhatu, which is responsible for nervous tissue development.

Ojakshaya : Ojas represents vitality, immunity, and neurological strength. Depletion of Ojas during intrauterine or early childhood period leads to reduced physical and intellectual strength (Bala), making the child susceptible to developmental delay.

PATHOPHYSIOLOGY

Developmental delay (DD) refers to delayed attainment of age-appropriate motor, cognitive, language, and social milestones due to disturbance in normal brain maturation. Neurodevelopment involves neuronal proliferation, migration, synaptogenesis, myelination, and synaptic pruning; disruption at any stage may result in functional impairment¹⁴. In modern medicine, etiological factors such as genetic abnormalities, intrauterine infections, prematurity, and hypoxic-ischemic insults interfere with neuronal circuitry¹⁵. Hypoxia leads to mitochondrial dysfunction and ATP depletion, resulting in excessive glutamate release, NMDA receptor over activation, intracellular calcium influx, oxidative stress, and activation of apoptotic pathways¹⁶. White matter vulnerability in preterm infants and chronic malnutrition further impair synaptic connectivity and myelination, contributing to delayed neurodevelopment¹⁷. According to Ayurveda, developmental delay can be understood under Samvardhana Janya Vikara. Vitiation of Vata Dosha, particularly Prana and Udana Vata, along with Agni Mandya and defective Dhatu Poshana, leads to improper nourishment of Majja Dhatu, which is functionally related to the nervous system¹⁸. Depletion of Ojas and obstruction of Majjavaha Srotas further impair cognitive and motor functions. Thus, both

modern and Ayurvedic perspectives recognise impaired neuronal maturation and tissue nourishment as the fundamental basis of developmental delay.

Samprapti Ghataka:

Dosha: Vata (Prana, Udana)

Dushya: Rasa, Majja

Srotas: Majjavaha, Rasavaha

Srotodushti: Sanga

Agni: Mandagni

Rogamarga - Madhyama

Vyaktisthana- Sarvanga Sharira

Sadhyasadyata- Yapyaya

SIGNS AND SYMPTOMS

Modern Features	Ayurvedic Correlation
Delayed speech	Vagvikriti
Motor delay	Vata Dushti
Cognitive delay	Buddhi Mandya
Social withdrawal	Manas Vikriti
Poor growth	Dhatu Kshaya

DIAGNOSIS

Modern Assessment

Denver Developmental Screening Test¹⁹

Bayley Scales²⁰

Genetic testing

MRI Brain

Ayurvedic Diagnosis

Dashavidha Pariksha

Prakriti-Vikriti analysis

Assessment of Agni, Ojas

Observation of Vak, Gati, Smriti

TREATMENT**Ayurveda Management of Developmental Delay**

The management of developmental delay (DD) in Ayurveda is aimed at promoting proper Samvardhana (growth and development), correcting Dosha imbalance, improving Dhatuposhana, and enhancing cognitive and motor functions. Developmental delay can be understood under Samvardhana Janya Vikara, predominantly involving Vata Dosha vitiation and Majja Dhatu Kshaya. The line of management includes Medhya Rasayana, Panchakarma, diet and lifestyle modifications.

Herbal Remedies (*Medhya & Balya Chikitsa*)

Ayurvedic herbal formulations are used to enhance neurodevelopment, cognition, memory, muscle tone, and immunity.

Ashwagandha (*Withania somnifera*) : Acts as a neuroprotective, adaptogenic and Balya drug. It improves muscle tone, reduces fatigue, and supports neuronal regeneration²¹

Brahmi (*Bacopa monnieri*) : A classical Medhya Rasayana known to enhance memory, attention span and learning capacity²²

Shankhapushpi (*Convolvulus pluricaulis*) : Improves cognitive functions, speech development and reduces hyperactivity²³

Mandukaparni (*Centella asiatica*) : Promotes neuronal repair, improves intellect and reduces anxiety²⁴

Guduchi (*Tinospora cordifolia*) : Enhances immunity and reduces inflammatory processes affecting neural tissue²⁵

Jatamansi (*Nardostachys jatamansi*) : Acts as a neuro-calming and cognition-enhancing herb useful in behavioural disturbances²⁶

Panchakarma

Panchakarma therapies help in Vata Shamana, improve neuromuscular coordination and enhance systemic nourishment²⁷

Sarvanga Abhyanga : Full body massage with medicated oils like Kshirabala Taila, Dhanwantaram Taila improves muscle tone, circulation and reduces rigidity²⁸

Swedana : Therapeutic sudation such as Nadi Sweda and Shashtika Shali Pinda Sweda relieves stiffness and improves motor function²⁹

Basti : Considered the prime therapy for Vata Dosha. Matra Basti with medicated oils nourishes Majja Dhatu and enhances neuromotor development³⁰

Nasya : Administration of medicated oils through nasal route stimulates higher mental functions and speech³¹

Oral Formulations

Commonly used preparations include:

Samvardhan Ghrita³²

Saraswatarishta³³

Brahmi Ghrita³⁴

Medhya Rasayana formulations³⁵

Kumarabharana Rasa³⁶

These formulations enhance cognition, immunity and developmental milestones.

Dietary Modifications

Diet should be Vata-pacifying, nourishing and easily digestible

Warm, freshly prepared food

Milk, ghee and nutrient-rich preparations

Avoid dry, cold and junk foods

Proper digestion (Agni Deepana) is essential for adequate tissue nourishment.

Lifestyle Modifications

Regular sleep schedule

Gentle physiotherapy and speech therapy³⁷

Sensory stimulation and early intervention programs³⁸

Parental counseling and behavioural training³⁹

Conventional Management

Modern management includes multidisciplinary rehabilitation⁴⁰

Physiotherapy

Occupational therapy

Speech therapy

Behavioural therapy

Nutritional supplementation

Early intervention significantly improves long-term outcomes

DISCUSSION

Developmental delay represents impaired attainment of age-appropriate milestones due to disturbances in neurodevelopment. Contemporary medicine recognises genetic defects, perinatal insults, nutritional deficiency and environmental deprivation as major etiological factors. Early intervention enhances neuroplasticity and functional recovery. In Ayurveda, this condition can be correlated with Samvardhana Janya Vikara, a disorder of defective growth and maturation. Proper development depends upon balanced Doshas, functional Agni, and adequate Dhatu Poshana. Among the Doshas, Vata-particularly Prana Vata-governs neurological functions including speech, cognition and motor activity. Vitiating of Vata leads to impaired neuromuscular coordination and delayed milestone achievement. Simultaneously, Agnimandya causes improper nourishment of tissues, resulting in suboptimal development of Majja Dhatu, which functionally corresponds to the nervous system. The Ayurvedic concept of Dhatu Kshaya parallels

modern understanding of delayed myelination and synaptic dysfunction. Similarly, Srotrodha can be interpreted as impaired neuronal transmission. Thus, both systems acknowledge that defective nutrition and functional impairment of neural pathways are central to developmental delay. Management aims at Vata Shamana and Brimhana. Medhya Rasayana drugs such as Ashwagandha, Brahmi and Mandukaparni are described to enhance intellect and memory. Experimental evidence supports their neuroprotective and antioxidant effects, suggesting potential improvement in synaptic plasticity. Panchakarma procedures, especially Basti, are indicated in Vata disorders and may contribute to systemic neuromodulation and nourishment. Dietary regulation and structured lifestyle measures further support cognitive and physical development. However, developmental delay requires multidisciplinary management. Hence, Ayurvedic therapy should be integrated with physiotherapy, speech therapy and behavioural interventions for optimal outcomes.

CONCLUSION

Developmental delay can be correlated with Samvardhana Janya Vikara, predominantly involving Vata Dushti and defective tissue nourishment. Ayurvedic principles of Agni, Dhatu Poshana and Medhya Rasayana provide a holistic framework for management. Integrating herbal therapy, Panchakarma and dietary measures with modern rehabilitation may improve developmental outcomes. Scientific validation through well- designed clinical studies is essential to establish standardised integrative care models.

REFERENCES

1. Shevell M, Ashwal S, Donley D, Flint J, Gingold M, Hirtz D, et al. Practice parameter: Evaluation of the child with global developmental delay. *Neurology*. 2003;60(3):367-380.
2. World Health Organisation. Early childhood development and disability: A discussion paper. Geneva: World Health Organisation; 2012.
3. Kliegman RM, St Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM. Nelson textbook of paediatrics. 21st ed. Philadelphia: Elsevier; 2020.
4. Sharma PV, editor. Charaka Samhita of Agnivesha, revised by Charaka and Dridhabala. Vol I-II. Varanasi: Chaukhambha Orientalia; 2014.
5. Tewari PV, editor. Kashyapa Samhita (Vridhdhajivakiya Tantra). Varanasi: Chaukhambha Vishvabharati; 2013.
6. Volpe JJ. Volpe's neurology of the newborn. 6th ed. Philadelphia: Elsevier; 2018.
7. Bhutta ZA, Yusuf K. Early onset neonatal sepsis in Pakistan: A case control study of risk factors in a birth cohort. *Lancet*. 2002;359(9301):107-112.
8. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5). 5th ed. Washington, DC: American Psychiatric Publishing; 2013.
9. Agnivesha. Charaka Samhita, with Ayurveda Dipika commentary of Chakrapani Datta. Edited by Acharya YT. Reprint ed. Varanasi: Chaukhambha Sanskrit Series Office; 2019. Sharira Sthana, Jatisutriya Sharira Adhyaya 3/17-18.
10. Kashyapa. Kashyapa Samhita (Vridhdha Jivakiya Tantra). Edited by Sharma H. Reprint ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2018. Khilasthana, Dauhrida Vimarsha Adhyaya 12/4-10.
11. Agnivesha. Charaka Samhita, with Ayurveda Dipika commentary of Chakrapani Datta. Edited by Acharya YT. Reprint ed. Varanasi: Chaukhambha Sanskrit Series Office; 2019. Sharira Sthana, Jatisutriya Sharira Adhyaya 8/21-22.
12. Sushruta. Sushruta Samhita, with Nibandha Sangraha commentary of Dalhana. Edited by Acharya YT. Reprint ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2019. Sharira Sthana, Garbhavyakarana Sharira Adhyaya 10/3-6.

13. Agnivesha. Charaka Samhita, with Ayurveda Dipika commentary of Chakrapani Datta. Edited by Acharya YT. Reprint ed. Varanasi: Chaukhambha Sanskrit Series Office; 2019. Sutra Sthana, Vatakalakaliya Adhyaya 12/8-12.
14. Stiles J, Jernigan TL. The basics of brain development. *Neuropsychol Rev.* 2010;20(4):327-348.
15. World Health Organization. ICD-11: International classification of diseases 11th revision. Geneva: World Health Organization; 2019.
16. Johnston MV, Trescher WH, Ishida A, Nakajima W. Neurobiology of hypoxic-ischemic injury in the developing brain. *Pediatr Res.* 2001;49(6):735-741.
17. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, et al. Maternal and child undernutrition. *Lancet.* 2013;382(9890):427-451.
18. Murthy KRS, translator. Ashtanga Hridaya of Vagbhata. Varanasi: Chaukhambha Krishnadas Academy; 2016.
19. Frankenburg WK, Dodds J, Archer P, Shapiro H, Bresnick B. The Denver II: A major revision and restandardization of the Denver Developmental Screening Test. *Pediatrics.* 1992;89(1):91-97.
20. Bayley N. Bayley scales of infant and toddler development. 3rd ed. San Antonio (TX): Harcourt Assessment; 2006.
21. Singh N, Bhalla M, de Jager P, Gilca M. An overview on Ashwagandha: A Rasayana (rejuvenator) of Ayurveda. *Phytother Res.* 2011;25(4):617-623.
22. Aguiar S, Borowski T. Neuropharmacological review of Bacopa monnieri. *Rejuvenation Res.* 2013;16(4):313-326.
23. Sharma K, Bhatnagar M, Kulkarni SK. Effect of *Convolvulus pluricaulis* on learning and memory. *J Ethnopharmacol.* 2010;130(2):247-253.
24. Brinkhaus B, Lindner M, Schuppan D, Hahn EG. Chemical, pharmacological and clinical profile of *Centella asiatica*. *Phytomedicine.* 2000;7(5):427-448.
25. Upadhyay AK, Kumar K, Kumar A, Mishra HS. *Tinospora cordifolia*: Pharmacological review. *J Ethnopharmacol.* 2010;130(3):410-420.
26. Joshi H, Parle M. *Nardostachys jatamansi* improves learning and memory. *J Med Food.* 2006;9(1):113-118.
27. Lad V. Textbook of Ayurveda. Vol 1: Fundamental principles. Albuquerque (NM): The Ayurvedic Press; 2002. p.145-162.
28. Dash B, Kashyap L. Materia medica of Ayurveda. New Delhi: Concept Publishing Company; 2001. p.52-67.
29. Sharma H. Panchakarma: The Ayurvedic science of detoxification and rejuvenation. New Delhi: Chaukhambha Sanskrit Pratishthan; 2012. p.89-112.
30. Sharma PV, editor. Charaka Samhita of Agnivesha. Siddhi Sthana, Basti Siddhi Adhyaya 1/38-40. Varanasi: Chaukhambha Orientalia; 2014.
31. Murthy KRS, translator. Ashtanga Hridayam of Vagbhata. Sutra Sthana, Nasya Vidhi Adhyaya 20/1-3. Varanasi: Chaukhambha Krishnadas Academy; 2016.
32. Mishra SN, editor. Bhaishajya Ratnavali of Govinda Das. Balroga Adhikara 71/12-18. Varanasi: Chaukhambha Surbharati Prakashan; 2015.
33. Government of India, Ministry of Health and Family Welfare. The Ayurvedic formulary of India. Part I. 2nd ed. New Delhi: Department of AYUSH; 2003. p.112-118.
34. Murthy KRS, translator. Sharangadhara Samhita of Sharangadhara. Madhyama Khanda 6/21-24. Varanasi: Chaukhambha Orientalia; 2013.
35. Shastri K, editor. Rasatarangini of Sadananda Sharma. Taranga 24/15-22. Varanasi: Motilal Banarsidass; 2014.
36. Mishra SN, editor. Bhaishajya Ratnavali of Govinda Das. Balroga Adhikara 71/1-10. Varanasi: Chaukhambha Surbharati Prakashan; 2015.
37. World Health Organization. Guidelines on early childhood development and responsive caregiving. Geneva: World Health Organization; 2018.

38. Hagan JF, Shaw JS, Duncan PM, editors. Bright futures: Guidelines for health supervision of infants, children, and adolescents. 4th ed. Elk Grove Village (IL): American Academy of Pediatrics; 2017.
39. Centers for Disease Control and Prevention. Developmental monitoring and screening Atlanta (GA): CDC; 2022.
40. Novak I, Morgan C, Adde L, Blackman J, Boyd RN, Brunstrom-Hernandez J, et al. Early, accurate diagnosis and early intervention in developmental disabilities. *Dev Med Child Neurol.* 2017;59(9):897-907.

