



Review Article

Developmental Disorders in Children: An Ayurvedic Review on *Bala Graha* and Neurodevelopment — A Critical Analysis

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Abstract (248 words)

Neurodevelopmental disorders represent a group of conditions arising from disturbances in brain development and function during early childhood. Increasing prevalence of developmental delays, autism spectrum disorder, attention-deficit/hyperactivity disorder, intellectual disability, speech disorders, and learning difficulties has created a significant global health burden. Modern neuroscience attributes these disorders to complex interactions between genetic factors, prenatal influences, environmental exposures, neuroinflammation, and altered neural connectivity. Ayurveda, the ancient science of life, provides a comprehensive pediatric perspective through the principles of *Kaumarbhritya*, *Bala*, *Manas*, *Indriya*, and *Bala Graha*. The concept of *Bala Graha* describes subtle pathological influences affecting children, particularly involving cognition, behavior, sensory functions, and developmental processes. This review critically evaluates the relationship between classical Ayurvedic descriptions of *Bala Graha* and contemporary concepts of neurodevelopmental disorders. Classical texts including *Kashyapa Samhita*, *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya* were analyzed along with modern scientific literature from PubMed, Scopus, and Web of Science. The review suggests that disturbances described in Ayurveda as impairment of *Manovaha*

Srotas, *Vata Dosha*, *Ojas*, and *Medha* may be conceptually correlated with neurodevelopmental dysfunction. Ayurvedic approaches including *Snehana*, *Swedana*, *Nasya*, *Basti*, *Medhya Rasayana*, and supportive lifestyle measures may provide a holistic framework for improving neurological development. Further clinical research integrating Ayurvedic concepts with modern neurodevelopmental assessment tools is required.

Keywords

Developmental disorders, Bala Graha, Ayurveda, neurodevelopment, Medhya Rasayana, Kaumarbhritya, child health

1. Introduction

Childhood represents a critical period of neurological development involving rapid growth of the brain, maturation of sensory systems, development of motor skills, language acquisition, emotional regulation, and cognitive abilities.

Neurodevelopmental disorders occur when these developmental processes are disrupted, resulting in long-term impairment of function [1].

Common developmental disorders include:

- Global developmental delay
- Autism spectrum disorder (ASD)
- Attention deficit hyperactivity disorder (ADHD)
- Intellectual disability
- Speech and language disorders
- Cerebral palsy
- Specific learning disorders [2]

The burden of developmental disorders has increased due to improved recognition, environmental influences, changing lifestyle patterns, and better diagnostic awareness.

Modern medicine identifies multiple contributing factors:

- Genetic abnormalities
- Prematurity
- Perinatal complications
- Nutritional deficiencies
- Environmental toxins
- Neuroinflammation [3]

Ayurveda describes childhood health under *Kaumarbhritya*, one of the eight branches of Ayurveda. The child is considered physiologically unique due to immature *Dhatu*, developing *Agni*, and delicate sensory and mental functions [4].

The classical concept of *Bala Graha* describes disorders affecting children where abnormal influences disturb physical, behavioral, sensory, and psychological development [5].

Although the term *Bala Graha* originates from ancient descriptions, its clinical manifestations can be explored in relation to modern neurodevelopmental disorders.

Aim

To critically review developmental disorders in children through Ayurvedic concepts of *Bala Graha* and correlate them with modern neurodevelopmental perspectives.

Objectives

1. To analyze classical descriptions of *Bala Graha*.
2. To review modern concepts of developmental disorders.
3. To correlate Ayurvedic neurological concepts with neurodevelopment.

4. To evaluate Ayurvedic preventive and therapeutic approaches.

2. Methodology of Literature Review

A narrative review was conducted using classical Ayurvedic literature and modern scientific databases.

Classical Ayurvedic Sources

Reviewed:

- *Kashyapa Samhita*
- *Charaka Samhita*
- *Sushruta Samhita*
- *Ashtanga Hridaya*
- *Bhava Prakasha*

Modern Databases

Searched:

- PubMed
- Scopus
- Web of Science
- Google Scholar

Keywords Used

“Child developmental disorder”

“Neurodevelopment Ayurveda”

“Bala Graha”

“Medhya Rasayana”

“Child cognition”

Inclusion Criteria

- Pediatric neurodevelopment studies
- Classical pediatric Ayurveda references
- Reviews on developmental disorders
- Evidence-based Ayurvedic interventions

Exclusion Criteria

- Adult neurological disorders
- Non-developmental psychiatric disorders
- Non-authenticated sources

3. Concept of Child Development in Ayurveda

Ayurveda considers childhood (*Bala Avastha*) as a period of:

- Growth
- Tissue development
- Cognitive maturation
- Sensory refinement [4]

The child possesses:

- Immature *Agni*
- Developing *Dhatu*

- Sensitive *Manas*

Therefore, children are more vulnerable to external and internal disturbances.

4. Concept of *Bala Graha*

The concept of *Bala Graha* is described mainly in *Kashyapa Samhita* and classical pediatric literature.

Graha refers to conditions affecting children that are difficult to identify through ordinary causes and may influence:

- Behavior
- Cognition
- Sensory functions
- Physical development [5]

Characteristics of *Bala Graha* Disorders

Descriptions include:

- Abnormal behavior
- Excessive crying
- Disturbed sleep
- Feeding difficulty
- Altered responses
- Developmental abnormalities [5]

5. Modern Concept of Neurodevelopmental Disorders

Neurodevelopmental disorders involve impairment in:

- Motor development
- Communication
- Social interaction
- Cognition
- Behavior [2]

5.1 Global Developmental Delay

Defined as significant delay in two or more developmental domains:

- Gross motor
- Fine motor
- Language
- Cognitive
- Social skills [6]

5.2 Autism Spectrum Disorder

Characterized by:

- Social communication difficulties
- Restricted behavior patterns
- Sensory abnormalities [7]

5.3 ADHD

Features include:

- Inattention
- Hyperactivity
- Impulsivity [8]

5.4 Intellectual Disability

Involves limitations in:

- Intellectual functioning
- Adaptive behavior [9]

6. Ayurvedic Correlation of Neurodevelopment

Neurodevelopment may be understood through concepts of:

Manas

Responsible for:

- Thought
- Emotion
- Perception

Buddhi

Responsible for:

- Intelligence
- Decision making

Smriti

Responsible for:

- Memory

Medha

Responsible for:

- Learning ability
- Retention capacity [10]

7. Role of Dosha in Neurodevelopment

Vata Dosha

Vata governs:

- Movement
- Sensory functions
- Nervous activity

Disturbance may produce:

- Delayed milestones
- Poor coordination
- Abnormal behavior

Kapha Dosha

Maintains:

- Stability
- Growth
- Strength

Imbalance may affect:

- Cognitive development
- Metabolism

Pitta Dosha

Controls:

- Processing
- Understanding
- Transformation

8. Correlation Between *Bala Graha* and Modern Disorders

Bala Graha Features	Modern Correlation
Developmental disturbance	Developmental delay
Abnormal behavior	Autism/ADHD
Speech abnormality	Language disorder
Poor cognition	Intellectual disability
Sensory disturbance	Sensory processing disorder

9. Pathophysiological Understanding of Developmental Disorders

Neurodevelopment is influenced by genetic programming, environmental factors, nutrition, immune regulation, and neuronal plasticity. Any disturbance during critical developmental windows may alter brain structure and function [3].

9.1 Modern Perspective

Major mechanisms involved include:

1. Altered Neuroplasticity

The developing brain requires appropriate formation and strengthening of neural connections.

Disturbance may affect:

- Learning
- Memory
- Cognitive processing [11]

2. Neuroinflammation

Chronic immune activation may influence:

- Synaptic development
- Neural communication
- Behavioral regulation [12]

3. Oxidative Stress

Increased oxidative injury affects:

- Neuronal cells

- Mitochondrial function
- Brain development [13]

9.2 Ayurvedic Interpretation

The above mechanisms may be correlated with:

Dhatvagnimandya

Improper tissue metabolism affecting nourishment of nervous tissue.

Majja Dhatu Dushti

Impairment of nervous system functions.

Ojas Kshaya

Reduced vitality and adaptive capacity.

Vata Vaigunya

Since *Vata* governs movement and neural activity, its imbalance may influence:

- Motor development
- Sensory processing
- Cognitive coordination [14]

10. Diagnostic Approach

Modern Assessment

Developmental evaluation includes:

Developmental Screening Tools

Examples:

- Denver Developmental Screening Test
- Ages and Stages Questionnaire
- Modified Checklist for Autism in Toddlers (M-CHAT) [15]

Clinical Assessment

Evaluation of:

- Gross motor milestones
- Fine motor skills
- Speech
- Social interaction
- Cognitive ability

Ayurvedic Assessment

Assessment includes:

- Prakriti
- Vikriti
- Agni
- Bala
- Manasika Bhava
- Sensory functions (Indriya Pariksha)

11. Modern Management of Developmental Disorders

Modern management is mainly supportive and focuses on improving functional ability.

11.1 Behavioral Therapy

Applied Behavioral Analysis (ABA)

Used mainly in autism spectrum disorder.

Goals:

- Improve communication
- Reduce maladaptive behavior
- Develop social skills [16]

11.2 Speech Therapy

Indicated for:

- Speech delay
- Communication disorders

Focus:

- Language development
- Expression
- Social communication

11.3 Occupational Therapy

Improves:

- Fine motor skills
- Sensory integration
- Daily activities

11.4 Pharmacological Management

Medicines are mainly symptom-oriented.

ADHD

Methylphenidate

Dose:

Children ≥ 6 years:

5 mg once or twice daily initially

May be increased gradually according to response.

Action:

Improves attention and reduces hyperactivity [17]

Autism Associated Irritability

Risperidone

Dose:

Children 5–16 years:

Starting:

0.25–0.5 mg/day

Adjusted according to response.

Sleep Disturbance

Melatonin

Dose:

1–5 mg at bedtime

Duration:

According to clinical requirement [18]

12. Ayurvedic Management of Developmental Disorders

Ayurvedic management focuses on:

1. Nourishment of nervous system
2. Improvement of cognition
3. Balancing *Vata Dosha*
4. Enhancing *Ojas*

Major approaches:

- Snehana
- Swedana
- Nasya
- Basti
- Medhya Rasayana

12.1 Abhyanga (Oil Massage)

Abhyanga is beneficial for balancing *Vata*.

Bala Taila Abhyanga

Ingredients:

- *Sida cordifolia*
- Sesame oil base

Dose: External application

Duration: 15–20 minutes daily

Course: 4–8 weeks

Benefits:

- Improves neuromuscular coordination
- Promotes relaxation
- Supports sensory development

12.2 Shiro Abhyanga

Application of medicated oil over scalp.

Useful for:

- Sleep disturbance
- Irritability
- Mental stress

Duration:

10–15 minutes daily

12.3 Nasya Therapy

Nasa hi Shiraso Dwaram

Nasal route is considered important for head and neurological functions [19].

Anu Taila Nasya

Dose:

2 drops each nostril

Frequency:

Daily

Duration:

Long-term supportive use

Benefits:

- Supports sensory functions
- Balances *Vata*

Brahmi Ghrita Nasya

Dose:

2 drops each nostril

Duration:

7–14 days therapeutic course

12.4 Basti Therapy

Basti is considered important for *Vata* disorders.

Matra Basti

Used as gentle pediatric supportive therapy.

Oil:

Bala Taila / Kshirabala Taila

Dose: According to age and physician assessment

Course: 15–30 days

Action:

- *Vata* balancing
- Neuromuscular nourishment

12.5 Medhya Rasayana

Medhya drugs improve:

- Memory
- Intelligence
- Learning capacity

Brahmi (*Bacopa monnieri*)

Dose:

250–500 mg extract twice daily

Duration:

8–12 weeks

Actions:

- Improves cognition
- Supports memory [20]

Mandukaparni (*Centella asiatica*)

Dose:

250–500 mg twice daily

Duration:

8 weeks

Actions:

- Neuroprotective
- Cognitive support

Shankhapushpi

Dose: 3–5 g powder daily

Duration: 6–12 weeks

Actions:

- Improves attention
- Supports mental function

Ashwagandha (*Withania somnifera*)

Dose: 250–500 mg extract daily

Duration: 8–12 weeks

Actions:

- Adaptogenic
- Supports neurological function [21]

12.6 Diet and Lifestyle

Recommended:

- Breastfeeding as per age recommendations
- Balanced nutrition
- Adequate sleep
- Structured daily routine

Avoid:

- Excess screen exposure
- Poor sleep habits
- Highly processed foods

13. Role of Ojas in Neurodevelopment

Ayurveda considers *Ojas* as the essence responsible for:

- Strength
- Immunity
- Mental stability [22]

Adequate *Ojas* supports:

- Cognitive development
- Emotional balance
- Disease resistance

Modern correlation:

Ojas may be conceptually associated with:

- Immune competence
- Neuroendocrine balance
- Physiological resilience

14. Comparative Understanding

Modern Concept	Ayurvedic Correlation
Brain development	<i>Majja Dhatu Vikas</i>
Neuroplasticity	<i>Medha</i> development
Cognitive function	<i>Buddhi</i>
Memory	<i>Smriti</i>
Behavioral regulation	<i>Manas</i>
Neurological imbalance	<i>Vata Vaigunya</i>

15. Research Gaps and Limitations

Despite extensive classical descriptions, limitations include:

1. Lack of standardized diagnostic criteria for *Bala Graha*
2. Limited clinical trials on Ayurvedic interventions
3. Need for objective neurological biomarkers
4. Lack of long-term pediatric follow-up studies

Future research should include:

- Neuroimaging studies
- Cognitive assessment tools
- Clinical trials of *Medhya Rasayana*
- Integrative rehabilitation models

16. Future Perspectives

Emerging areas include:

- Ayurvedic neurodevelopmental assessment models
- Personalized interventions based on *Prakriti*
- Integration of Ayurveda with developmental pediatrics
- Study of herbal neuroprotective mechanisms

Modern techniques such as:

- Functional MRI
- EEG
- Neuropsychological testing

may help evaluate Ayurvedic concepts scientifically.

17. Conclusion

Developmental disorders represent complex disturbances of neurological growth and function. Ayurveda provides a holistic understanding through concepts of *Bala Graha*, *Vata*, *Manas*, *Buddhi*,

Medha, and *Ojas*. Although direct equivalence between *Bala Graha* and modern neurodevelopmental disorders cannot be established, significant conceptual similarities exist regarding behavioral changes, sensory dysfunction, and developmental impairment. Ayurvedic approaches including *Abhyanga*, *Nasya*, *Basti*, and *Medhya Rasayana* may offer supportive strategies for improving neurological development and quality of life. Scientific validation through well-designed clinical research remains essential.

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