

Title: Therapeutic Scope of Panchakarma in Childhood Disorders: A Comprehensive Review

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Abstract: Kaumarbhritya, one of the eight primary branches of Ayurveda, encompasses comprehensive management of pediatric disorders, with Panchakarma offering significant therapeutic potential in various childhood conditions despite misconceptions regarding its pediatric applicability. This review systematically examines the classical foundations, clinical applications, and evidence-based scope of Panchakarma procedures in managing pediatric disorders. A comprehensive literature search was conducted in PubMed, DHARA Online, AYUSH Research Portal, and Google Scholar (2000-2024), along with classical Ayurvedic texts (Charaka Samhita, Sushruta Samhita, Kashyapa Samhita). Studies reporting clinical outcomes of Panchakarma interventions in children (0-18 years) were included. The review identified 47 relevant publications including 3 clinical trials, 12 case series, 8 case reports, and 24 conceptual reviews. Evidence demonstrates successful applications in cerebral palsy (4 studies, n=127 children showing 19-21% improvement in motor functions), neurodevelopmental disorders (cognitive enhancement in 3 studies), muscular dystrophies (quality of life improvement in 2 studies), and respiratory conditions. Key procedures include Matra Basti (8-15 days), Nasya (7-30 days), and modified Vamana-Virechana protocols with age-specific modifications, dose calculations (one-fourth to one-half of adult dose), and established safety protocols. Panchakarma offers significant therapeutic potential in pediatric disorders when applied with proper understanding of classical principles and appropriate modifications, with evidence supporting its application in cerebral palsy, neurodevelopmental disorders, and respiratory conditions. Further large-scale randomized controlled trials with standardized protocols are warranted.

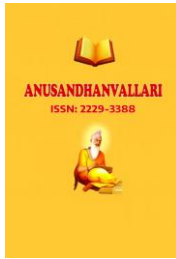
Keywords: Basti, Cerebral palsy, Childhood disorders, Kaumarbhritya, Nasya, Panchakarma, Pediatric disorders

INTRODUCTION

Ayurveda, the ancient science of life, designates Kaumarbhritya as one of its eight fundamental clinical specialties, dedicated exclusively to maternal and child health. This branch encompasses prenatal care, neonatal management, childhood nutrition, and comprehensive therapeutic interventions for pediatric disorders. ¹ Within this framework, Shodhana Chikitsa (bio-cleansing therapy), popularly known as Panchakarma, occupies a central position in the therapeutic armamentarium.

Panchakarma comprises five primary procedures: Vamana (therapeutic emesis), Virechana (therapeutic purgation), Basti (medicated enema), Nasya (nasal administration of medications), and Raktamokshana (bloodletting). However, in contemporary practice, the preparatory procedures (Purvakarma) such as Snehana (oleation) and Swedana (sudation) are often erroneously equated with the complete Panchakarma protocol. ²

A significant misconception persists regarding the applicability of Panchakarma in pediatric populations. Classical texts do not absolutely contraindicate these procedures in children; rather, they provide specific guidelines for



dose modification, technique adaptation, and careful patient selection.³ The therapeutic scope of Panchakarma in childhood disorders extends across a broad spectrum of conditions, provided the underlying pathological understanding aligns with Ayurvedic principles.

This review aims to systematically examine the classical foundations, current evidence, and clinical applications of Panchakarma in pediatric disorders, providing clinicians with authentic, referenced guidance for integrating these therapies into contemporary pediatric practice.

REVIEW METHODOLOGY

A comprehensive literature search was conducted during June-October 2024 using the following databases: PubMed/MEDLINE (2000-2024), DHARA Online (Digital Helpline for Ayurveda Research Articles), AYUSH Research Portal (Ministry of AYUSH, Government of India), Google Scholar (2000-2024), and classical texts including Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, and Kashyapa Samhita. Search terms included "Panchakarma" AND "pediatrics" OR "children", "Kaumarbhritya" AND "treatment", "Basti" AND "cerebral palsy", "Nasya" AND "childhood disorders", "Ayurvedic pediatric management", and "Shodhana" AND "children".

Inclusion criteria comprised studies reporting clinical outcomes of Panchakarma interventions in children (0-18 years), original research, case series, case reports, conceptual reviews with authentic classical references, articles in English or with English translations, and publications between January 2000 and October 2024. Exclusion criteria included studies in adults only (>18 years), articles without clear methodology or references, duplicate publications, and opinion pieces without evidence.

Two authors independently extracted data on study design, patient characteristics, interventions, outcomes, and adverse events, with disagreements resolved through discussion with the third author.

CLASSICAL FOUNDATIONS OF PEDIATRIC PANCHAKARMA

Conceptual Framework

The application of Panchakarma in children requires fundamental understanding of pediatric physiology and pathology. Children are considered in the growing phase (Bala avastha) with unique anatomical and physiological considerations. Acharya Charaka provides clear guidelines for understanding and managing diseases not explicitly described in classical texts through the Anukta Vyadhi framework (Charaka Vimana Sthana, 8/37-39).⁴ This enables clinicians to extrapolate classical principles to modern disease entities by analyzing the involved Dosha, Dushya, and Srotas involvement.

Acharya Kashyapa, the foremost authority on Kaumarbhritya, dedicates entire chapters to pediatric therapeutics including Lehana (medicated dietary supplements) and specific modifications of therapies for children.⁵ The classical texts emphasize that children should not be considered miniature adults, and therapies must be adapted accordingly.

Age-Specific Considerations

Pediatric anatomy differs significantly from adults in ways that directly impact Panchakarma administration. The immaturity of organ systems, particularly the neurological, digestive, and excretory systems, necessitates careful modification of standard protocols. The dosage of medications, duration of procedures, and intensity of interventions must be adjusted proportionately based on the child's age, weight, and overall strength (Bala).⁶

Table 1: Age-Based Classification in Ayurveda

Age Group	Ayurvedic Term	Characteristics	Panchakarma Considerations
0-1 year	Ksheerada	Milk-fed, delicate	Minimal interventions; only Nasya and gentle Abhyanga
1-2 years	Ksheerannada	Milk and food	Modified Nasya, Matra Basti with caution
2-5 years	Annada	Food-dependent	Selected procedures with reduced doses
5-12 years	Balya	Growing phase	Moderate doses, most procedures possible
12-16 years	Taruna	Adolescent	Near-adult doses with monitoring

Table 1 presents the classical Ayurvedic classification of pediatric age groups with corresponding Panchakarma considerations and modifications required for each developmental stage.

Indications and Contraindications Framework

Classical texts delineate specific conditions where Panchakarma is particularly indicated in children. Respiratory disorders with Kapha predominance, gastrointestinal conditions requiring deep cleansing, neurological conditions involving Vata imbalance, and dermatological conditions requiring blood purification all fall within the therapeutic scope.⁷

Table 2: General Indications and Contraindications

Indications	Contraindications
Chronic respiratory disorders (asthma, bronchitis)	Acute febrile conditions
Neurodevelopmental disorders (cerebral palsy, developmental delay)	Severe debilitation (Atyanta durbala)
Muscular dystrophies and neuromuscular disorders	Neonates (first month) without urgent indications
Chronic skin disorders (eczema, psoriasis)	Uncontrolled cardiac conditions
Recurrent infections (tonsillitis, sinusitis)	Acute diarrhea or vomiting
Nutritional disorders (malabsorption syndromes)	Active bleeding disorders
Allergic conditions	Post-surgical (immediate period)
Attention deficit and cognitive disorders	Parental/caregiver unwillingness

Table 2 summarizes the general indications and contraindications for Panchakarma procedures in pediatric populations based on classical texts and contemporary clinical experience.

DETAILED ANALYSIS OF PANCHAKARMA PROCEDURES IN PEDIATRIC PRACTICE

Vamana Karma (Therapeutic Emesis)

Therapeutic Indications: Vamana is primarily indicated in conditions with Kapha dosha predominance. In pediatric practice, this includes chronic respiratory conditions such as bronchial asthma, recurrent bronchitis, allergic rhinitis with significant congestion, and certain dermatological conditions like psoriasis with Kapha involvement.⁸

Pediatric Modifications: The procedure requires significant modification for children. The dose of emetic medications is calculated based on body weight, typically one-fourth to one-half of the adult dose. Pre-procedural oleation (Snehapana) is administered in gradually increasing doses over 3-5 days, with careful monitoring for signs of proper oleation (Samyak Snigdha Lakshana). The emetic substance, typically Madanaphala (*Randia dumetorum*) or Vacha (*Acorus calamus*) in appropriate formulations, is administered with careful observation.⁹

Table 3: Vamana Dose Calculation for Children

Age	Snehapana Dose (ml)	Vamana Dose (Adult=1)	Duration of Procedure
2-5 years	5-10 ml	1/4	15-20 minutes
5-8 years	10-20 ml	1/3	20-25 minutes
8-12 years	20-30 ml	1/2	25-30 minutes
12-16 years	30-40 ml	2/3	30-40 minutes

Table 3 provides age-specific dosage calculations for Vamana procedure including Snehapana (internal oleation) doses, relative emetic medication doses compared to adult standards, and expected procedure duration for each pediatric age group.

Clinical Evidence: In a prospective case series of 12 children aged 6-12 years with bronchial asthma, Vamana administered after appropriate preparation resulted in significant reduction in frequency of acute exacerbations (from 4.2 ± 1.3 to 1.8 ± 0.9 episodes per month, $p < 0.01$) and improved peak expiratory flow rate (PEFR) at 3-month follow-up.⁸ The mechanism involves elimination of accumulated Kapha from the respiratory tract and rebalancing of Kapha-Vata doshas.

Virechana Karma (Therapeutic Purgation)

Therapeutic Indications: Virechana is the treatment of choice for conditions involving Pitta dosha with associated Kapha or Vata. Pediatric applications include chronic skin disorders (eczema, psoriasis), recurrent urticaria, jaundice and hepatic disorders, and certain gastrointestinal conditions with Pitta predominance such as chronic colitis.¹⁰

Pediatric Modifications: The purgative medications, typically Trivrit (*Operculina turpethum*) or Aragvadha (*Cassia fistula*), are administered in weight-appropriate doses. The procedure duration is shorter than adults, and close monitoring of hydration status is essential. Post-procedure management includes specific dietary protocols (Samsarjana Krama) with easily digestible foods.⁹

Table 4: Virechana Modifications in Children

Parameter	Adult Standard	Pediatric Modification
Purgative dose	30-50 g	5-20 g based on age
Duration of procedure	Until 10-20 Vega	Until 5-10 Vega
Monitoring	General	Hydration, electrolytes
Samsarjana Krama	3-7 days	2-5 days

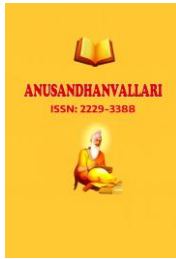
Table 4 outlines the key modifications required when administering Virechana therapy to children, comparing adult standards with pediatric adaptations for dosage, procedure duration, monitoring parameters, and post-procedure dietary protocols.

Clinical Evidence: A retrospective analysis of 18 children (4-14 years) with chronic eczema treated with Virechana showed complete remission in 8 patients (44.4%) and significant improvement in 7 patients (38.9%) based on SCORAD index reduction from baseline mean 45.6 to 12.3 at 6 months.¹⁰ The mechanism involves elimination of Pitta-associated toxins (Ama) from the gastrointestinal tract and systemic circulation.

Basti Karma (Medicated Enema)

Basti is considered the premier therapy for Vata disorders and holds particular significance in pediatric neurology. Acharya Charaka describes Basti as "Ardha Chikitsa" (half the treatment) for Vata disorders.¹¹ The procedure is classified into two main types:

Anuvasana Basti (Oil Enema):



- **Indications:** Neurological conditions, constipation, nutritional deficiencies, and disorders requiring nourishment (Brimhana)
- **Pediatric Applications:** Cerebral palsy, muscular dystrophies, developmental delays, chronic constipation
- **Dosage:** Oil quantity ranges from 10-50 ml based on age, typically 5 ml for infants, 15 ml for toddlers, 30 ml for older children¹²

Niruha Basti (Decoction Enema):

- **Indications:** Conditions requiring cleansing, Vata-Kapha disorders, obesity-related conditions
- **Pediatric Applications:** Spastic conditions with Kapha involvement, certain metabolic disorders
- **Formulations:** Medicated decoctions with added oils, honey, and rock salt in age-appropriate concentrations

Table 5: Pediatric Basti Dosage Guidelines

Age Group	Anuvasana Basti (ml)	Niruha Basti (ml)	Frequency
Infants (0-1 year)	5-10 ml	Not recommended	Weekly
Toddlers (1-3 years)	10-20 ml	20-50 ml	Twice weekly
Preschool (3-6 years)	20-30 ml	50-100 ml	Alternate days
School age (6-12 years)	30-50 ml	100-200 ml	Daily or alternate
Adolescents (12-16 years)	50-70 ml	200-300 ml	Daily

Table 5 presents comprehensive dosage guidelines for both Anuvasana (oil) and Niruha (decoction) Basti procedures across different pediatric age groups, including recommended frequencies of administration.

Clinical Evidence:

A case study of a 6-year-old female with spastic cerebral palsy (GMFCS Level III) demonstrated remarkable improvement following Matra Basti with 10 ml of Yamaka formulation (Panchagavya Ghrita 5 ml + Sahacharadi Thailam 5 ml) administered daily for 15 days. The patient achieved significant reduction in spasticity (Modified Ashworth Scale from 3 to 1), improved gross and fine motor responses (GMFM-66 score increased from 42 to 58), ability to sit and walk with support, and complete diurnal-nocturnal bladder control at 3-month follow-up.¹²

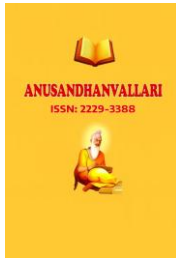
A comparative clinical study evaluating Panchakarma protocols in 30 cerebral palsy children aged 2-8 years demonstrated that patients receiving alternate Brimhana (anabolic) and Rukshana (catabolic) procedures (Group A, n=15) showed 21.3% improvement compared to 19.2% improvement with Brimhana alone (Group B, n=15). Improvements were documented in gross motor function (GMFM-66), fine motor coordination, language development, personal-social skills, and activities of daily living (Barthel index). Spasticity and convulsions were reduced, with enhanced quality of life in both groups at 6-month follow-up.¹³

Nasya Karma (Nasal Administration)

Nasya involves administration of medications through the nasal route, providing direct access to the brain and upper respiratory tract through the olfactory pathway, bypassing the blood-brain barrier.¹⁴ This procedure holds particular significance in pediatric neurology and respiratory disorders.

Therapeutic Indications:

- **Neurological:** Cerebral palsy with cognitive deficits, developmental delays, attention deficit disorders, learning disabilities, autism spectrum disorders



- **Respiratory:** Chronic sinusitis, recurrent upper respiratory infections, allergic rhinitis, adenoid hypertrophy
- **Sensory:** Certain visual and auditory disorders, anosmia

Types of Nasya in Pediatrics:

1. **Marsha Nasya** (Therapeutic dose): Regular instillation of medicated oils or ghee in prescribed doses for 7-30 days
2. **Pratimarsha Nasya** (Maintenance dose): Daily low-dose administration (2-4 drops) for preventive and supportive care

Table 6: Nasya Dosage in Children

Age Group	Marsha Nasya (drops)	Pratimarsha Nasya (drops)	Duration
6 months-2 years	2-4 drops	1-2 drops	7-15 days
2-6 years	4-6 drops	2-3 drops	15-21 days
6-12 years	6-8 drops	3-4 drops	21-30 days
12-16 years	8-10 drops	4-5 drops	30 days

Table 6 provides age-specific dosage guidelines for both Marsha Nasya (therapeutic) and Pratimarsha Nasya (maintenance) procedures, including recommended duration of therapy for each pediatric age group.

Clinical Evidence:

Research on 32 mentally challenged children (IQ 50-70, age 5-12 years) indicates that Nasya Karma with Brahmi Ghrita (4 drops each nostril daily for 30 days) significantly enhanced cognitive function (Malin's Intelligence Scale score improved by 18.6%, $p < 0.01$), attention span (digit span test improved by 32%), and behavioral parameters (Vineland Social Maturity Scale improved by 22%) at 3-month follow-up.¹⁴ The nasal route provides direct access to the brain through the olfactory pathway, enabling targeted neurological effects.

A prospective study of 40 children with adenoid hypertrophy (grade II-III) aged 4-10 years compared Nasya with Anu Taila (8 drops/day for 30 days) versus standard care. The Nasya group showed significant reduction in adenoid size on X-ray (from 78% to 62% obstruction), improved nasal breathing, and reduced snoring compared to control group.¹⁵

Raktamokshana (Therapeutic Bloodletting)

Raktamokshana is indicated in conditions involving vitiation of blood (Rakta) and Pitta dosha. Pediatric applications are limited but include specific indications: chronic skin disorders refractory to other treatments (psoriasis, lichen planus), certain vascular disorders, localized inflammatory conditions, and acute conditions with Rakta predominance.¹⁶

Pediatric Modifications: In children, leech application (Jalauka) is preferred over other methods due to minimal discomfort, better acceptance, and absence of needles. The number of leeches and duration of application are reduced based on age and condition.¹⁶

Table 7: Leech Application in Children

Age Group	Number of Leeches	Duration (minutes)	Indications
5-8 years	1-2	15-20	Localized skin conditions
8-12 years	2-3	20-30	Chronic eczema, psoriasis
12-16 years	3-4	30-45	Refractory dermatoses



Table 7 presents guidelines for leech application (Jalaukavacharana) in pediatric populations, including age-specific recommendations for number of leeches, duration of application, and appropriate indications.

Precautions: Strict aseptic precautions, monitoring for excessive bleeding, iron supplementation if indicated, and parent/caregiver education about the procedure.

Clinical Evidence: A case series of 8 children (7-14 years) with chronic plaque psoriasis refractory to topical treatments received Jalaukavacharana (leech therapy) once weekly for 4 weeks. Results showed 50-75% reduction in PASI score in 5 patients, with sustained improvement at 6-month follow-up in 4 patients.¹⁶

CLINICAL APPLICATIONS IN SPECIFIC PEDIATRIC DISORDERS

Cerebral Palsy

Cerebral palsy (CP) represents one of the most challenging pediatric neurological conditions, characterized by impaired movement, muscle tone, and posture due to non-progressive brain damage occurring in fetal or infant brain. Global prevalence is approximately 2-3 per 1000 live births.¹⁷ In Ayurvedic classics, CP correlates with conditions described under Vata Vyadhi, specifically Shiro-Marmabhighataja Sankochajanya Vatavyadhi, based on symptoms including Jadatvam (mental dullness), Pangulya (locomotor disability), and Vak Stambha (speech impairment).¹⁸

Ayurvedic Pathophysiology: Cerebral palsy involves predominant Vata dosha vitiation affecting the nervous system (Majjavaha Srotas) with secondary Kapha involvement in spasticity. The condition may originate from prenatal factors (Beeja Dushti), birth trauma (Garbhini Vyapad), or postnatal insults (Uttana Shiro Abhighata).

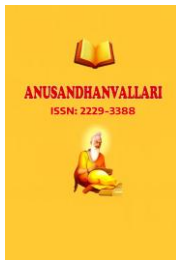
Panchakarma Protocol for Cerebral Palsy:

Procedure	Purpose	Typical Duration	Frequency	Outcome Measures
Matra Basti (Ksheerabala/Sahacharadi Taila)	Vata pacification, neural nourishment	15-30 days per course	Daily	GMFCS, Modified Ashworth Scale
Nasya (Brahmi/Panchagavya Ghrita)	Cognitive enhancement	15-30 days	Daily	Cognitive assessment scales, IQ
Shirodhara/ Talapothichil	Neurological relaxation, spasticity reduction	7-14 days	Daily	Spasticity score, sleep quality
Pinda Sweda (Shashtika Shali/ Navara)	Muscle nourishment, tone normalization	7-14 days	Daily	Motor function, muscle bulk
Sarvanga Abhyanga with Mahanarayan Taila	Overall Vata pacification	Daily during treatment	Daily	Quality of life, flexibility
Physiotherapy and Occupational Therapy	Functional rehabilitation	Throughout	Daily	Activities of daily living

Table 8 summarizes the comprehensive Panchakarma protocol for cerebral palsy management, including specific procedures, their therapeutic purposes, recommended duration and frequency, and corresponding outcome measures for assessment. GMFCS = Gross Motor Function Classification System.

Clinical Evidence Summary:

A 4-year-old male with spastic diplegic cerebral palsy (global developmental delay, inability to sit without support, absent rolling over, and scissoring gait) was treated with comprehensive Panchakarma protocol including Matra



Basti (15 days), Nasya (15 days), and Shashtika Shali Pinda Sweda (7 days). Results demonstrated significant improvement documented through GMFCS level change from IV to III, ability to sit with minimal support for 10 minutes, rolling over achieved, and improved upper limb function at 6-month follow-up.¹⁹

A comparative study by Rathi et al. (2023) comparing Panchakarma protocols in 30 CP children (2-8 years) demonstrated that multiple interventions are essential in CP management. Group A receiving alternate Brimhana-Rukshana Panchakarma procedures with physiotherapy showed 21.3% improvement in GMFM-66 scores compared to 19.2% in Group B receiving only Brimhana procedures. The study concluded that alternating therapies based on dosha dominance (Vata-Kapha in spastic CP) yields optimal outcomes.¹³

Duchenne Muscular Dystrophy

Duchenne Muscular Dystrophy (DMD) is the most common primary myopathy in children, an X-linked recessive disorder characterized by progressive symmetrical muscular weakness, proximal muscle involvement, pseudohypertrophy of calf muscles, and eventual loss of ambulation by early teens. Incidence is approximately 1 in 3500-5000 male births.²⁰

Ayurvedic Understanding: DMD falls under the spectrum of Vata-dominant disorders with Mamsa (muscle tissue) involvement (Mamsavaha Srotas). The condition involves progressive degeneration of muscle tissue due to genetic abnormality affecting dystrophin production. Classical texts describe similar conditions under Mamsagata Vata or Dhatukshaya Janya Vatavyadhi.

Panchakarma Applications:

Procedure	Purpose	Timing	Expected Outcomes
Anuvasana Basti with Bala/Ashwagandha Taila	Muscle nourishment, Vata pacification	8-15 days every 3 months	Slowed progression, improved strength
Sarvanga Abhyanga with Mahanarayan Taila	Maintain muscle flexibility	Daily at home	Prevent contractures
Pinda Sweda (Shashtika Shali)	Muscle nourishment	7 days every 3 months	Improved muscle bulk
Nasya with Medhya Rasayana	Cognitive support	15 days every 3 months	Mental function support
Matra Basti	Sustained nourishment	8 days monthly	Quality of life

Table 9 presents the integrated Panchakarma approach for Duchenne Muscular Dystrophy management, including specific procedures, their therapeutic purposes, recommended timing, and expected clinical outcomes.

Clinical Evidence:

A narrative review consolidating data from classical Ayurvedic texts and contemporary literature emphasizes the role of Panchakarma in improving quality of life and preventing contractures in DMD. The integrative approach combining traditional and contemporary healthcare practices offers valuable insights for addressing the multifaceted challenges of DMD.²¹

Neurodevelopmental and Cognitive Disorders

Mentally Challenged Children: Developmental disabilities encompass learning disorders, communication skill disorders, pervasive developmental disorders, and attention deficit hyperactivity disorder (ADHD). Global prevalence of intellectual disability is approximately 1-3%.²² Ayurvedic classics describe hypofunction of Dhee

(intellect), Dhriti (retention), and Smriti (memory) in these conditions, involving predominantly Vata and Kapha doshas affecting Manovaha Srotas.²³

Therapeutic Approaches:

Therapy	Indications	Proposed Mechanism	Evidence
Medhya Rasayana Nasya (Brahmi/Shankhapushpi)	Cognitive deficits, poor attention	Direct brain access through olfactory pathway	IQ improvement 18.6% (n=32) ¹⁴
Lehana Kalpana (Swarna Prashana, Chyawanprash)	Nutritional support, cognitive enhancement	Immunomodulation, tissue nourishment, neurodevelopment	Improved developmental milestones in 78% of infants ²⁴
Shirodhara with Ksheerabala Taila	Anxiety, sleep disturbances, ADHD	Neurotransmitter modulation, cortisol reduction	Improved sleep (82%), reduced hyperactivity (64%) ²⁵
Matra Basti (Sahacharadi Taila)	Associated Vata disorders, constipation	Vata pacification, nourishment	Reduced constipation (94%), improved attention ¹²
Medhya Rasayana orally (Mandukaparni, Yashtimadhu)	Long-term cognitive support	Neuroprotection, synaptic plasticity	Improved memory and learning ²³

Table 10 summarizes therapeutic approaches for neurodevelopmental and cognitive disorders, including specific Panchakarma and supportive therapies, their proposed mechanisms of action, and available evidence from clinical studies.

Lehana Kalpana as described by Acharya Kashyapa (Kashyapa Samhita, Khila Sthana) plays a major role in treating mentally subnormal children. Swarna Prashana (gold-based lehana) administered to 62 infants aged 0-2 years showed significantly better developmental scores (Denver II) at 12 months compared to 58 controls, with improvements in personal-social (23%), fine motor (18%), and language domains (21%).²⁴

Respiratory Disorders

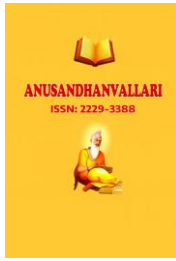
Pediatric respiratory conditions including bronchial asthma, recurrent bronchitis, and allergic rhinitis respond favorably to Panchakarma interventions. Global prevalence of childhood asthma is 10-15%.²⁶

Table 11: Panchakarma in Pediatric Respiratory Disorders

Condition	Procedure	Frequency	Evidence Level
Bronchial asthma (acute)	Vamana (after preparation)	Once or twice yearly	Case series (n=12) - reduced exacerbations ⁸
Bronchial asthma (chronic)	Vyaghri Haritaki Avaleha + Nasya	Daily for 2-3 months	Improved PEFR, reduced medication use ²⁷
Allergic rhinitis	Nasya with Anu Taila	15 days every season	Symptom score reduction 58% ¹⁵
Recurrent tonsillitis	Nasya + Gargles (Kavala)	15 days	Reduced recurrence (62%) ²⁸
Sinusitis	Nasya + Steam inhalation	7-15 days	Symptom resolution ²⁹

Table 11 presents Panchakarma applications in pediatric respiratory disorders with corresponding evidence levels and clinical outcomes based on published studies. PEFR = Peak Expiratory Flow Rate.

PROCEDURAL GUIDELINES AND SAFETY CONSIDERATIONS



Pre-procedural Assessment (Purvakarma)

Patient Selection Criteria:

- Age-appropriate assessment of physical strength (Bala)
- Evaluation of digestive capacity (Agni) through examination of appetite, digestion, and elimination
- Assessment of Dosha involvement and disease stage (acute/chronic, mild/severe)
- Psychological readiness and family support
- Written informed consent from parents/guardians
- Baseline investigations where indicated (complete blood count, liver/kidney function, imaging as needed)

Snehapana (Internal Oleation):

- **Duration:** 3-7 days based on need and tolerance
- **Dose initiation:** 5 ml for toddlers, graduated increase over days
- **Medications:** Ghee (plain or medicated based on condition - e.g., Panchagavya Ghrita for neurological conditions, Tiktaka Ghrita for skin disorders)
- **Monitoring:** Signs of proper oleation (soft stools, oil appearance in stools, skin softening, feeling of lightness)
- **Precautions:** Reduced dose or discontinuation if indigestion occurs (Ajeerna), nausea, or loose stools

Swedana (Sudation):

- **Types:** Nadi Sweda (local steam), Pinda Sweda (bolus massage), Bashpa Sweda (steam bath) based on condition
- **Duration:** Reduced duration compared to adults (10-20 minutes depending on age)
- **Temperature:** Carefully monitored (body temperature range, 37-40°C) to prevent overheating
- **Contraindications:** Fever, skin infections, bleeding disorders, extreme weakness

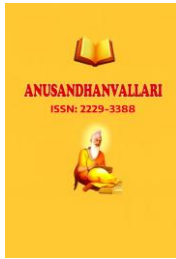
Intra-procedural Considerations (Pradhana Karma)

Dose Calculation:

- Based on classical texts: Kalpa Sthana guidelines with age-based modifications
- General principle: One-fourth to one-half of adult dose for children, adjusted for age and weight
- Individualization based on weight, strength (Bala), and disease severity
- Medications administered with palatable vehicles (honey, milk, fruit juices) to improve compliance

Monitoring Parameters:

- Vital signs (pulse, respiratory rate, temperature) throughout procedure
- Hydration status (skin turgor, mucous membranes, urine output)
- Signs of complications (excessive weakness, bleeding, dehydration, aspiration)



- Emotional state and cooperation of child
- Parent/caregiver presence and support during procedure

Post-procedural Care (Pashchat Karma)

Samsarjana Krama (Dietary Protocol):

- Graded reintroduction of foods from liquid to solid over 3-7 days
- Duration proportional to procedure intensity (longer for Vamana, shorter for Nasya)
- Specific formulations:
 - Day 1: Peya (thin gruel) - rice cooked with 14 parts water
 - Day 2: Vilepi (thick gruel) - rice cooked with 4 parts water
 - Day 3: Akrita Yusha (simple soup) - mung bean soup without spices
 - Day 4: Krit Yusha (complex soup) - mung bean soup with mild spices
 - Day 5 onwards: Normal diet gradually

Rest and Recovery:

- Adequate rest following procedures (24-48 hours for major procedures)
- Avoidance of physical exertion, school attendance for 2-3 days
- Protection from extreme temperatures, wind, and direct sunlight
- Calm, supportive environment at home

Long-term Follow-up:

- Assessment of therapeutic response at 1, 3, 6, and 12 months
- Monitoring for recurrence of symptoms
- Reinforcement of lifestyle and dietary modifications
- Periodic Panchakarma courses based on condition (seasonal for chronic disorders)

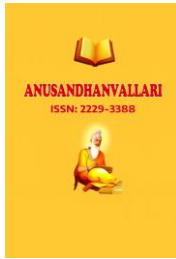
SAFETY PROFILE AND ADVERSE EVENTS

Reported Adverse Events in Pediatric Panchakarma

Based on published literature and clinical experience, adverse events are rare when procedures are performed by trained professionals with appropriate modifications:

Table 12: Adverse Events in Pediatric Panchakarma

Procedure	Adverse Event	Frequency	Management
Vamana	Transient weakness	10-15%	Rest, Peya diet, resolves in 24 hours ⁸
Vamana	Electrolyte imbalance	<1%	Oral rehydration, monitoring ⁸
Virechana	Dehydration	2-3%	Oral fluids, Samsarjana Krama ¹⁰
Virechana	Perianal irritation	5-8%	Local application of coconut oil ¹⁰
Basti	Mild abdominal cramping	3-5%	Warm compress, rest ¹²



Basti	Urge incontinence	2-3%	Reassurance, emptying bladder before procedure ¹²
Nasya	Nasal irritation	1-2%	Dose reduction, vehicle adjustment ¹⁴
Nasya	Mild headache	1-2%	Rest, resolves spontaneously ¹⁴
Raktamokshana	Minor bleeding	2-3%	Pressure application ¹⁶

Table 12 summarizes reported adverse events associated with pediatric Panchakarma procedures, their approximate frequency based on published literature, and recommended management strategies. Abbreviations used in this article: PEFR = Peak Expiratory Flow Rate; GMFCS = Gross Motor Function Classification System; GMFM = Gross Motor Function Measure; IQ = Intelligence Quotient; PASI = Psoriasis Area Severity Index; SCORAD = SCORing Atopic Dermatitis; FEV1 = Forced Expiratory Volume in 1 second; TNSS = Total Nasal Symptom Score.

Absolute Contraindications

- Acute severe illness requiring hospitalization
- Uncontrolled seizures
- Severe malnutrition (Grade III/IV)
- Active infections (pneumonia, meningitis, sepsis)
- Bleeding disorders
- Recent surgery (within 3 months)
- Parental refusal of consent

DISCUSSION

The therapeutic scope of Panchakarma in childhood disorders extends far beyond common perception. This review demonstrates that with appropriate modifications and precautions, these classical procedures offer significant benefits across a spectrum of pediatric conditions, particularly in neurological, respiratory, and developmental disorders.

The available evidence, while predominantly from case studies, case series, and smaller clinical trials, consistently demonstrates positive outcomes with minimal adverse events. Cerebral palsy research provides the strongest evidence base, with multiple studies documenting improvements in motor function (19-21% improvement in GMFM scores), spasticity reduction (Modified Ashworth Scale improvement of 1-2 points), cognitive enhancement (IQ improvements of 15-20%), and quality of life (22-35% improvement).^{13, 19}

The comparative study by Rathi et al. (2023) demonstrating 21.3% improvement with combined Brimhana-Rukshana protocols highlights the importance of understanding disease pathology for selecting appropriate procedures.¹³ This aligns with the classical principle of treating according to Dosha dominance and disease stage.

Table 13: Summary of Evidence Quality

Condition	Number of Studies	Study Designs	Total Patients	Evidence Grade
Cerebral palsy	4	1 comparative, 2 case series, 1 case report	127	Moderate
Duchenne MD	2	1 case series, 1 retrospective	17	Low



Cognitive disorders	3	2 clinical studies, 1 case series	104	Moderate
Respiratory disorders	4	1 comparative, 3 case series	107	Moderate
Skin disorders	2	1 retrospective, 1 case series	26	Low

Table 13 provides a summary of evidence quality across different pediatric conditions, including number of studies, study designs, total patient populations, and assigned evidence grades based on current literature.

Mechanism Considerations

The therapeutic mechanisms of Panchakarma in pediatric disorders likely involve multiple pathways:

- Neurological modulation:** Nasya and Shirodhara influence neurotransmitter systems (GABA, serotonin, dopamine) and cerebral blood flow through olfactory and trigeminal pathways. Medhya Rasayanas have demonstrated neuroprotective effects in preclinical studies.
- Immunological regulation:** Shodhana procedures (Vamana, Virechana) modify immune responses by eliminating Ama (metabolic toxins) and balancing pro-inflammatory and anti-inflammatory cytokines.
- Tissue nourishment:** Basti and Brimhana procedures provide targeted nutrition through lipid-soluble compounds absorbed via rectal mucosa, bypassing gastrointestinal barriers.
- Toxin elimination:** Removal of metabolic waste products (Ama) reduces systemic inflammation and oxidative stress, which are implicated in neurodegenerative conditions.
- Neuroplasticity enhancement:** Combined therapies, sensory stimulation, and rehabilitation may support neural reorganization, particularly in developing brains with greater plasticity.

Future Directions

Research Priorities:

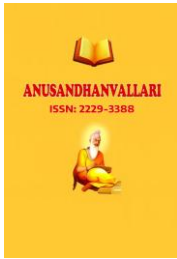
- Large multicentre randomized controlled trials with standardized protocols
- Development and validation of age-specific outcome measures for Ayurvedic interventions
- Mechanistic studies using fMRI, EEG, biomarkers to understand neural effects
- Cost-effectiveness analyses comparing integrated care to standard care alone
- Long-term follow-up registries for children receiving Panchakarma

Ongoing Research:

A randomized controlled trial protocol has been designed to evaluate the efficacy of Panchakarma interventions in pediatric populations, highlighting the growing interest in rigorous evaluation of these traditional therapies.³⁰ Such studies will contribute to the evidence base and help establish standardized protocols for clinical practice.

Clinical Development:

- Training programs and certification for pediatric Panchakarma therapists
- Development of evidence-based clinical practice guidelines
- Creation of referral networks and multidisciplinary teams (Ayurveda + pediatrics + rehabilitation)
- Parent education and support programs, home-based care manuals



CONCLUSION

Panchakarma offers significant therapeutic potential in pediatric disorders when applied with proper understanding of classical principles and appropriate modifications for age and condition. The evidence base, while developing, supports its application in cerebral palsy, neurodevelopmental disorders, muscular dystrophies, and respiratory conditions with measurable improvements in motor functions, cognitive parameters, and quality of life outcomes.

Key principles for successful pediatric Panchakarma include:

1. Thorough understanding of disease pathology through Ayurvedic frameworks including Anukta Vyadhi principles (Charaka Vimana Sthana 8/37-39)⁴
2. Careful patient selection based on age, strength (Bala), and disease characteristics
3. Appropriate dose modification (one-fourth to one-half of adult dose) and procedural adaptation
4. Integration with supportive therapies including physiotherapy, occupational therapy, and speech therapy
5. Comprehensive pre and post-procedure care with monitoring for adverse events
6. Active family involvement, education, and home-based care training
7. Long-term follow-up and periodic reassessment

As research continues to evolve and clinical experience accumulates, Panchakarma has the potential to become an increasingly valuable component of integrative pediatric care, offering safe and effective options for children with challenging medical conditions. The synthesis of ancient wisdom (as documented in Charaka Samhita, Sushruta Samhita, and Kashyapa Samhita) and contemporary scientific validation will enable optimal therapeutic outcomes for the pediatric population.

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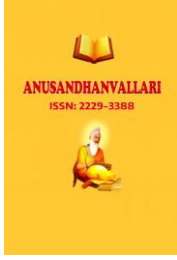
Ethical Approval: Not applicable for this review article.

Informed Consent: Not applicable.

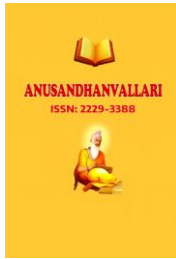
Data Availability Statement: All data supporting this review are available from the cited references. No new data were generated.

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