



Research Article

Impact of add on effect of *Panchakarma* therapies in the management of Rickets: A case report

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Received: 27-09-2025

Accepted: 21-06-2026

Published: 30-06-2026

Abstract

A 3.5 year old male child came to *kaumarabhritya* outpatient department with complaint of inability to stand without support and inability to walk without support. On examination, lab test, patient was diagnosed with nutritional rickets. The management included *panchakarma* procedures with Vitamin D 3 and calcium supplementation. Upon follow-up after 10 days of treatment, the patient showed slight improvement and was able to stand without support and walk with support and after one month of treatment, the patient was walking without support, and had a good appetite with a slight increase in weight. *Ayurveda* mentioned various diseases related to the children and their therapeutic management. *Ayurveda* gives prime focus to the health of children therefore described health related issue of children in separate branch called as *Kaumarabhritya*. Nutritional insufficiency, lack of immunity, diminishes digestive strength and weak physical strength, etc. mainly considered responsible for childhood disorders. There are many disorders related to the nutritional deficiency which described as *Apatarpanajanya vyadhis* in *Ayurveda* and *Phakka roga* is one of them. This condition on the basis of symptomatic similarities can be correlated as rickets as per the modern science. Despite the high incidence of nutritional deficiencies, there is still a lack of awareness and late presentations of such cases, which can lead to complications if not detected early. The management primarily focuses on improving *Agni*, nutrition, and tissue nourishment through *Brimhana*, *Deepana-Pachana*, and *Rasayana* therapies, which help promote growth and development in children. In the management of *Phakka Roga Prakruta rasa Nirmana* is very important by improvement in *mandagni* with the help of *Mrudu Shodhana (Udavartanam)* followed by *Deepan, Pachana, Bruhana therapy*. This case demonstrates the importance of *Ayurveda* line of management with supplementation in improving the sign and symptoms of rickets.

Keywords: *Apatarpana janya vyadhi, Bala shosha, Mandagni* in children, *Phakka roga, Panchakarma, Rickets, Vitamin D deficiency*

Access this article
online

Website:
<https://ijam.co.in>



DOI: <https://doi.org/10.47552/ijam.v17i2.6592>

Introduction

Rickets is a disabling childhood condition that results from impaired bone mineralization at the growth plates. It is

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characterized by skeletal deformity, stunted growth, bone pain, and muscle weakness. (1) Untreated rickets can result in failure to thrive, developmental delay, lifelong skeletal deformity, obstructed labor, and osteomalacia. Vitamin D deficiency and/or calcium deficiency are the most common causes of rickets. (1) Vitamin D deficiency is often the result of insufficient sunlight exposure in combination with inadequate vitamin D intake. (2)

Nutritional rickets seems to be more common in low-and middle-income countries, especially the Indian subcontinent, Africa, and the Middle East (3). Rickets is a common childhood skeletal

disorder that causes the bones to soften and become weak resulting in bone deformities (4). The patients can present with symptoms of bone pain, poor growth, and delayed motor skills. This includes fatigue, bone pain, depression, hair loss, muscle weakness, and loss of appetite. Complications of rickets include failure to thrive, abnormally curved spine, bone deformities, dental defects, and seizures. (5)

In *Kaumarbhritya* definition *Acharya Sushruta* mentioned a word-*kumara bharana* means *bharana- Poshana* of child. Due to lack of proper nutrition *phakka* and *balashosha vyadhi* can occurs. (6) *Phakka vyadhi* was described by *Acharya Kashyapa* in *Kashyapa samhita*. *Phakka* means inability to walk even after one year of life. *Phakka* is included in *kuposhanjnya vyadhi*. (7) *Phakka* disease is described by *Acharya Kashyapa* which is not limited to a single disease but it is clinical presentation seen in end stage of many chronic progressive disorders.

In this case report, we describe a 3.5year male child as a case of nutritional rickets caused by severe nutritional deficiencies treatment with *Ayurveda* line of treatment w.r.t *Phakka roga* as an add on effect with vitamin d and calcium supplementation.

Case presentation

A 3.5-year-old male child was brought by his parents to the *Kaumarabhritya* Outpatient Department at KLE Ayurveda Hospital & Research Centre, Belagavi, Karnataka, with complaints of inability to stand without support and inability to walk independently since the age of 2 years. Based on the presenting features, the child was highly suspected as a case of severe rickets.

The child was born at term by normal vaginal delivery with a birth weight of 3.5 kg and length of 52 cm, within the 90th centile range. He cried actively at delivery with an Apgar score of 9/10 at one and five minutes and suffered no complications. He was exclusively breastfed up to 6 months of age, without any vitamin D supplementation. His vaccinations were up to date and he had no known allergies. He had 2 older siblings and no family history of a similar condition.

On examination, it was seen that developmentally, he was delayed and could not stand unsupported and could not walk with support. It was observed that there was marked widening of the wrists and bowing of the legs. Harrison sulcus was noted, but the rachitic rosary was not visible. other examination, including cardiothoracic and neuromuscular examinations, revealed no additional findings. Initial blood tests revealed elevated alkaline phosphatase (824 U/L; normal range (n): 156-369), total vitamin D [11.0 NG/ML; normal range 30-100]. Wrist X-ray findings were consistent with the clinical findings showing fraying, widening, and cupping of the metaphyseal ends of both the ulna and the radius. Defects in mineralization were evident yielding a picture of active rickets with rachitic changes.

Treatment

The management primarily focuses on improving *Agni*, nutrition, and tissue nourishment through *Brimhana*, *Deepana-Pachana*, and *Rasayana* therapies, which help promote growth and development in children. (8)

In the management of *Phakka Roga Prakruta rasa Nirmana* is very important by improvement in *mandagni* with the help of *Mrudu Shodhana (Udavartanam)* followed by *Deepan, Pachana, Bruhana* therapy.

Vit D is administered orally either in a single dose of 600,000 IU or over 10 days (60,000IU daily for 10 days) followed by a maintenance dose of 400-800IU/day and oral calcium supplement 30 -75 mg/kg/day for 2 months.

Samprapti (Pathophysiology)

The child was a picky eater and does not consume home cooked meals, child usually eat chips, chocholate, biscuits, tea etc, which are *Asatmaya ahar* leads to *kosthagni mandhyata* which further causes allevation of *doshas* i.e, *vridhi* of *vata (karshya, ushnakamita, shakrutgraha, balabhramsha)* , *vridhi* of *kapha (agnisadana , shlatjangatva, recurrent cold cough)* and *pita ksaahya (mandeanala)* which leads to *kapha avruta vatapita* and causes *shrotoavrodha* i.e, *annavaha (arochaka, vipaka)*, *rasavah (krushaangata, naashoagni)*, *pureeshavaha (atigrathiata)* this further causes *dhatukshaya* i.e, *rasa (emaciation)*, *rakta (desire of cold and sour things)*, *mamsa (emaciation of cheeks buttocks)*, *medakshaya (emaciation of body)*, *asthikshaya (dhanakarma)* causes origin of *phaka roga*.

Samprapti ghatak

1. *Hetu- Asatmya Aharaa*

Ahara (Dietry history) – According to the informant i.e, mother (reliable) child was a fussy eater and don't eat home cooked meals, child was given outside food such as chips, chocolates, biscuits, ice-creams etc, on daily basis.

2. *Dosh- Vata*

3. *Dushya- Ras, Asthi*

4. *Agni- Jatharagni, dhatavagani*

5. *Strotas- Ras,Rakta, Mamasa, Asthi, Majja*

6. *Strotodushiti- Vimargagamana*

7. *Adhishtana- Asthi*

Therapeutic intervention

The patient was admitted in our hospital for 12 days (17/02/2024 to 28/02/2024) and started with panchakarma therapy. The treatment was planned according to the nature of the disease i.e, *bahudosaja* and the line of treatment was prepared to do the *vighatana* of *samprapti*.

Table 1: Table showing intervention, dose, duration and its justification

Intervention	Dose	Treatment duration	Justification
Oral medication (<i>Deepana & Pachana</i>)			Child diet includes mostly of outside food such as icecream, chips, biscuits etc, which are low in nutritive value and causes impairment of digestion. The child came with chronic history of impaired digestion therefore, for other treatment or medication to act the most important 1 st step is to correct the <i>kosthagata ama</i> which further improve the <i>dhatugata ama avastha</i> .

1	<i>Panchakola phanta</i>	10 ml thrice a day with lukewarm water	3 days (17/02/24- 19/02/2024)	Child had <i>mandagni</i>
2	<i>Sukhasaraka churna</i>	10 gm at night with lukewarm water	3 days (17/02/24- 19/02/2024)	Child had complain of constipation
3	Rukshana		1 sitting of 3 days (17/02/24- 19/02/2024)	<i>Lakshana</i> of <i>Shrotoavrudha</i> i.e, indigestion, <i>panduroga</i> .
	<i>Udyartana</i> with <i>triphala churna</i>	Quantity sufficient, once a day		
	<i>Nadi sweda</i> with <i>Dashmoola kashaya</i>	Quantity sufficient, once a day		
Panchakarma therapy			1 sitting of 8 days (20/02/2024- 28/02/2024)	
2	Purva karma			
	<i>Abhayanga</i> with <i>Dhanvantari taila</i>	Quantity sufficient, once a day	8 days (20/02/2024- 28/02/2024)	
	<i>Nadi sweda</i> followed by <i>annalepa</i>	Quantity sufficient, once a day	8 days (20/02/2024- 28/02/2024)	
3	Sodhana			Child had <i>lakshana</i> of <i>bahudosha avastha</i> i.e, <i>avipaka, panduta, daurbalya</i> .
	<i>Yoga basti</i>		Total 8 days (<i>niruha</i> for 3 and <i>anuvāsana</i> for 5 days) (20/02/2024- 28/02/2024)	
	<i>Niruha basti</i> with <i>kashaya</i> of <i>guduchi</i> (50ml)+ <i>vacha</i> (5gm)+ <i>sunthi</i> (5gm) and <i>kalka</i> of <i>shatapushpa</i> (5gm), <i>honey</i> (5gm), <i>saindhava</i> (5m)	70 ml once a day in the morning empty stomach		
	<i>Anuvāsana basti</i> with <i>gugglu tiktam ghrita</i>	Total 20 ml once a day after lunch		
3	Vesthana and Upanaha		Total 8 days (20/02/2024- 28/02/2024)	Child had <i>shtanika</i> accumulation of <i>doshas</i> in lower limb
	<i>Vesthana</i> with <i>balashwagandha taila</i>	Quantity sufficient, once a day	4 th , 6 th , 8 th , 10 th day (20, 22, 24, 26, 28 February/ 2024)	
	<i>Uapanha</i> with <i>godhumadi</i> (<i>godhuma</i> + <i>eranda churnad</i> + <i>tila churna</i> + <i>tila taila</i> + <i>saindhava</i> + <i>kanzi</i>)	Quantity sufficient, once a day	5 th , 7 th , 9 th , 11 th day (21, 23, 25, 27 February/ 2024)	
Shamana				
1	<i>Asthiposhaka vati</i>	1 tab twice a day in the morning and evening with lukewarm water	30 days (01/03/2024- 30/03/2024)	
2	Syrup <i>Trikatu</i>		30 days (01/03/2024- 30/03/2024)	

3	Sarvanga abhyanga with Balashwagandha taila	Quantity sufficient once a day before bath from lukewarm water	30 days (01/03/2024-30/03/2024)	
Supplements				
4	Calcium	75mg/kg/day (5 ml twice a day)	2 months (01/03/2024-30/04/2025)	
5	Vitamin D	60,000 IU once a week 1 sachet once a week with ½ cup of milk)	6 weeks	

Table 2: Table 2 shows the diet to be included with mode of administration, ingredients and justification

Sr no.	Diet	Administration	Duration	Ingredients	Justification
1	Lotus seed kheer (payasam)	Once a day before food (evening)	1 month (01/03/2024-30/03/2024)	Lotus seed ½ cup Go- milk 2 cup Dates 4 (regular size)	Child had history of improper food habits, consume food with less nutritional property and less in calories. This will provide caloric dense meal with properties to increase calcium content in the diet.
2	Go ghrita	With every meal	1 month (01/03/2024-30/03/2024)	Itsf	<i>Agnivardhaka, Deepana</i>

Follow up and observation/ result**Timeline of case****Table 3: Table 3 shows timeline of case having clinical event, intervention with date**

Date	Clinical event and intervention
15/02/24	The child was brought to seek <i>Ayurveda</i> treatment in KLE <i>ayurveda kaumarabhritya</i> OPD. The child provisional diagnosis was made according to the history signs and symptoms i.e, Nutritional deficiency anemia (<i>Phakka</i>), and further investigation was done.
16/02/24	With the help of investigation reports the diagnosis was confirmed.
17/02/24 – 19/02/24	<i>Rukshana</i> and <i>deepana pachana</i> .
20/02/24 – 28/02/24	<i>Sarvanaga abhayanga</i> , <i>nadi sweda</i> followed by <i>anna lepa</i> , <i>yoga basti</i> , <i>vesthana</i> alternate with <i>upanaha</i>
01/03/24	Follow up was taken and it was observed that there was a slight improvement in the signs and symptoms of the child. The child was able to stand without support and walk with support. Appetite was improved by 80%. Patient was discharged with the supplementation and <i>Ayurveda</i> medications
15/03/24	2 nd Follow up was taken with the child. The child started walking without support

Discussion**Discussion on Agni**

In Agni, the term refers to the processes of digestion and metabolism in the body. Although *Agni* is considered innumerable due to its presence in every paramānu (cell) of the body, classical *Ayurvedic* texts describe 13 types of *Agni* based on their function and site of action: one *Jatharagni*, five *Bhutagni*, and seven *Dhatvagni*. *Jatharagni* is the principal digestive fire responsible for digesting food and converting it into nutritive essence and waste. *Bhutagni* acts on the elemental components of food, while *Dhatvagni* governs metabolism within the body tissues. The

transformation process ultimately produces two components: *Prasada* (nutritive essence) for tissue nourishment and *Kitta* (waste) for elimination. (9)

In *Ayurveda*, *Agni* is considered the key factor responsible for digestion and metabolism in the body. Similar to modern concepts where metabolic processes and cellular division occur continuously in body cells, *Ayurveda* also recognizes the body as composed of innumerable minute units. According to *Charaka*, these units are extremely subtle and countless. The processes of conjunction and disjunction of these cells are primarily governed by *Vata* and the inherent nature of action. (9)

Table 4: Table 4 shows drugs with its mode of administration and discussion on mode of action

Drug	Mode of administration	Discussion on mode of action
<i>Panchakola phanta</i>	Oral	<i>Panchkola Phanta</i> serves the purpose of <i>Deepan</i> and <i>Pachana</i> , thus eliminating the root cause of the disease and correcting the <i>Agni</i> and does the
<i>Sukhasara churna</i>	Oral	As <i>nitya virechana</i> , this act as <i>Shodhana Karma</i> (purificatory therapy) helps to clean the <i>Srotas</i> (channels) and rejuvenates them thus, ensuring a proper transportation of the metabolites. (11)
<i>Triphala churna</i>	<i>Udvartana</i> (local application)	For rectification of the <i>dhatavagni</i> (metabolism at the tissue level), the cells start throwing away the toxins and <i>ama</i> and cleanse themselves. <i>Bhavaprakash</i> has mentioned <i>triphala</i> as <i>kaphapitahara</i> . (12)
<i>Dashmoola kwath</i>	<i>Nadi sweda</i> (local application)	<i>Swedana</i> is <i>sweda karakatva</i> which means it would promote <i>sweda</i> , which is a type of <i>mala</i> . <i>Sweda</i> is related to <i>dhatavagni</i> and <i>bhutagni</i> . The <i>saraguna</i> of the drug enables them to act on the <i>snigdhadosha</i> in the channels and direct them to move towards <i>kostha</i> or excrete them through micropores of the skin in the form of sweat, resulting in <i>srotosodhana</i> . (13)
<i>Dhanvantari taila</i>	<i>Abhanyanga</i> (local application)	In <i>Sahasrayoga</i> under <i>Taila Yoga Prakarana</i> , the formulation is described with the property that it is highly beneficial in conditions involving weakness or injury of <i>bala</i> (strength), <i>marma</i> (vital structures), <i>asthi</i> (bone), and <i>kshata-kshina</i> (tissue depletion). (14)
<i>kashaya</i> of <i>guduchi</i> + <i>vacha</i> + <i>sunthi</i> and <i>kalka</i> of <i>satapushpa</i>	<i>Niruha basti</i> (anal region)	As the nature of the disease is <i>bahudoshaja</i> , <i>sodhana</i> would, help to clean the <i>shrotas</i> and rejuvenate them, thus ensuring a proper transportation of
<i>Gugglu tiktam ghrita</i>	<i>Anuvasana basti</i> (anal region)	<i>Kashaya</i> drugs possessing <i>Tikta rasa</i> are described in <i>Ayurveda</i> as <i>Tridoṣahara</i> , and modern pharmacological studies suggest that several plant-derived phytochemicals exhibit phytoestrogenic and anti-osteoporotic activities, thereby supporting their beneficial role in bone metabolism and
		In <i>Ashtanga Hridaya</i> , <i>ghrita</i> is described to possess the ability to penetrate deeply into the <i>sandhi</i> (joints), <i>asthi</i> (bone), and <i>majja</i> (bone marrow) tissues, thereby supporting nourishment and therapeutic action at these levels.
		Both of the procedures are the type of <i>swedana</i> but does not cause excesses <i>aptarpana</i> hence would not lead to excessive increase in <i>vata doshas</i> as the drugs are used is of <i>vatahara</i> properties as well as <i>bhramaniya</i> effect. The local application of the drugs help to alleviate the <i>sthanika doshas</i> and provide strength and will act on <i>dhatuvagni</i> , hence promote the <i>dhatu</i> formation.
<i>Balashwagandha taila</i>	<i>Vesthana</i> (local application)	In <i>Sahasrayogam</i> , the formulation is described as <i>Kṣaya-nasana</i> , alleviating various <i>Vata</i> disorders and conditions associated with tissue depletion.(19)
<i>Godhumadi upnaha</i>	<i>Upanaha</i> (local application)	The lipoidal bond is very much suitable for penetration of drug molecule through stratum corneum, (20) and the drugs in this <i>upanaha</i> such as <i>tila kalka</i> , <i>erandamoola</i> , <i>tila taila</i> are having <i>vatahara</i> properties and <i>gokshira</i> , <i>godhuma</i> have <i>balya</i> effect, thereby helping to alleviate <i>Sthanika Vata Dosha</i> , nourish the tissues, and promote therapeutic action at the local site. (21)
<i>Asthiposhaka vati</i>	Oraly	<i>Kukkutandatvak Bhasma</i> provides a natural and bioavailable source of calcium that supports bone remineralization and strengthening. Other ingredients such as <i>Shodhit Laksha</i> , <i>Asthisamharaka</i> , <i>Arjuna</i> , and <i>Babboola</i> promote fracture healing and bone regeneration, (22) while <i>Shodhit Guggulu</i> exhibits anti-resorptive and anti-inflammatory properties, collectively aiding in bone repair and restoration of bone strength. (23)
<i>Trikatu syrup</i>	Oraly	It contains drugs such as <i>pippali</i> , <i>maricha</i> , <i>shunti</i> which are <i>katu</i> in <i>rasa</i> and have <i>pachana</i> effect. <i>Acharya sarangadhara</i> mention the properties such as <i>deepana</i> , <i>shleshmaghna</i> , <i>jayet arochakam</i> and in <i>ama avastha</i> . Hence would help to improve digestion which lead to proper formation of <i>rasa dhatu</i>

Conclusion

Panchakarma therapies, when utilized as an adjunct to conventional treatment, demonstrated a favorable impact on both clinical outcomes and the overall growth and development of the child. Following the intervention, the child was able to stand without support and walk with support. Additionally, appetite improved by approximately 80%. There was also a significant

improvement in nutrient absorption, along with enhancement of *Agni*, strengthening of the musculoskeletal system, and correction of *Doṣa-Dhatu* imbalance.

Further Scope: The role of *panchkarma* in managing rickets as an add on effect provides promising benefit. Long term follow up studies imposing the impact of *panchkarma* on bone strength, milestones and nutritional status in children would provide in depth assessment and results.

Informed consent: Informed consent was taken from parents priorly. The procedures, purpose, potential benefits, and possible risks of the interventions were clearly explained in a language understandable to them.

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