



Complementary Feeding in Infants: An Ayurvedic Overview

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Abstract

Complementary feeding (commonly known as weaning) means gradual introduction of foods to baby other than breast milk when breast milk alone is insufficient to meet the nutritional requirements. This systematic transition from breastfeeding to complementary foods normally extends from 6 months to 2 years and is considered as a very vulnerable period. Proper complementary feeding is a major intervention in reducing under five mortality rate especially in developing countries. The guidelines for infant feeding mentioned in *Ayurveda* are on par with the modern infant nutrition practices. *Phalaprasana* and *Annaprasana* which marks the ceremonial introduction of fruits and cereals are mentioned in Ayurvedic classics along with various complementary foods and nutritional supplements which can provide enough energy and nutrients to meet the requirements of the rapid growing child. Breastfeeding should be continued up to 2 years along with the complementary foods. An attempt has been made to combine various descriptions about complementary feeding from classical Ayurvedic text books and to interpret them in the light of scientific studies and knowledge.

Keywords: *Ayurveda*, infant nutrition, complementary feeding, *sthanya apanayana, phalaprasana, annaprasana*.

Introduction

Ayurveda has given prime significance for nutrition and dietary practices and *Ahara* is considered as one among the three pillars supporting life (*Traya Upasthambha*).¹ Excellence of ingested food is an important factor which is responsible for proper growth and development. Dietary requirement of an individual varies with age, sex and physical activities so that it provides sufficient energy for all life processes, growth, repair and maintenance. So selection of proper diet is considered as the corner stone of health, especially in the case of young children whose growth and development occurs at a rapid pace. As per *Acharya Kashyapa* place, time and digestive capacity should not be transgressed while selecting diet for children.² *Ayurveda* considers diet as the greatest medicament³ and if nourishment is proper it imparts satisfaction, nutrition, patience, intellect, enthusiasm, virility, strength, good voice, ojas, glow, longevity, radiance etc.⁴ Optimal feeding of child with adequate nutrients is regarded as the most effective method to attain proper growth and development which occurs at a rapid pace during the first few years of life. Failure of this can cause adverse effects on health of the child. The National Family Health Survey (NFHS)-4 (2015-16) indicates that 35.7 % children below five years are underweight, 38.4% are stunted and 21 % are wasted in the country. Child undernutrition is an underlying cause in an estimated 35% of all deaths among children under five years and

21% of total global disability adjusted life years lost among under 5 age group of children. Undernutrition is strongly associated with shorter adult height, less schooling, reduced economic productivity and for women, lower offspring birthweight. Low birthweight and undernutrition in childhood are risk factors for diabetes, hypertension and dyslipidemias in adulthood.⁵ *Phakka, Parigarbhika* etc are important *kuposhanajanya vyadhis* or nutritional disorders that are described due to improper feeding practices. As per UNICEF, proper breastfeeding and complementary feeding are two interventions that are estimated to prevent one – fifth of total under- five mortality rates in developing countries.⁶

Proper infant and young child feeding

WHO/UNICEF have emphasized the first 1000 days of life i.e, the 270 days in-utero and the first two years after birth as the critical window period for nutritional interventions. In case of any growth faltering or deficiencies of micronutrients it is very difficult to reverse them after 2 years of age. During antenatal period, child's nutrition solely depends on mother's nutrition. As per *Ayurveda*, whatever food the pregnant mother takes, it is divided into three parts- one part is for the mother's nutrition, one part is for developing nutrients in breast milk and the remaining part is for nourishment of the fetus.⁷ After birth, child should be breastfed within an hour and exclusive breastfeeding should be carried out up to 6 months of age. During this phase, additional food or fluid is not required as breast milk is nutritionally complete for child's growth and development and it protects from infections and strengthens immune system.⁸ *Ayurveda* has well emphasised benefits of breastfeeding and has stated that breast milk alone is needed for growth and development of the child.⁹ Dietary regimen and lifestyle modifications to be followed for improving quantity and quality of breast milk has been mentioned in Ayurvedic classics.

After six months of age, breast milk alone is not enough to meet the requirements of growing child. The gap between nutritional requirement and amount obtained from breast milk increases with age. So complementary feeding has to be initiated during this period to meet up with the extra energy requirements. Complementary feeding refers to food which complements breast milk and ensures that the child continues to have enough energy, protein and other nutrients to grow normally.¹⁰ *Ayurveda* has also greatly emphasized complementary feeding practices and its initiation is considered as an important milestone in the life of the child. Breast feeding should be continued along with complimentary feeding up to 2 years of age. Because of various socio- economic and cultural factors, lack of proper complementary feeding still remains as a challenge to child nutrition. So caretakers should be motivated to provide a balanced diet.

Age to introduce complimentary diet

Nutritional requirement varies in every stage of growth in the child and hence timely feeding of proper diet is considered as an important factor determining wellness of the child. Ayurvedic classics have mentioned gradual withdrawal of breast feeding as *sthanya apananyana vidhi* and introduction of fruits or semisolid food as *phalapasana- annapasana vidhi* . It is considered as an important milestone in the growth and development of the child. Ayurvedic way of age classification of children is also based on their main diet viz; *Ksheerapa-* child upto 1 year of age whose main diet continues to be breastmilk, *Ksheerannada-* child upto 2 years who feeds on milk and semisolid foods and *Annada-* child above 2 years who takes foods other than milk as main diet.¹¹ As per opinion of *Vagbhata*, gradual withdrawal from breastfeeding should be done when teething starts and child should be gradually accustomed with suitable nourishing food which are easily digestible. *Acharya Kashyapa* has instructed *phalapasana* during 6th month of life, which indicates feeding the child with fruits and fruit juices. Introduction of cereals as semisolids ie, *Annapasana* has been explained by *Kashyapa* in the 10 th month or after eruption of teeth.¹² while *Vagbhata* and *Susrutha* has explained it in 6th month.

Given that growth is generally not improved by complementary feeding before 6 months even under optimal conditions and also there can be a tendency to displace breast milk, complementary feeding is not recommended before 6 months. As the child grows, there will be a rapid rise in nutritional demands and also there will be gradual depletion of iron and calcium store in the body. Breast milk output of mother increases till 6 months and later plateaus off. Birth weight of the baby doubles by 5 months of age and needs around 600-700 kcal/day. But daily breast milk output of 600 ml provides only 400 kcal which will be insufficient for the baby. Developmental signs like head control, hand mouth coordination and palmar grasp are seen between four to six months of age. Gum hardens prior to tooth eruption and biting movements begins. Intestinal amylase matures and gut of the baby becomes ready to accept cereals and pulses. Thus 6 months seems to be the best time to introduce semisolid foods to baby. Early weaning is often due to ignorance and leads to contamination and infection due to the unhygienic preparation. Late weaning leads to stunted growth and malnutrition.¹³ In India, at the age of 6-8 months only 54 percent of breast fed and 75 per cent of non-breast fed infants are initiated into complimentary feeds.¹⁴ It is advisable to follow the whole procedure of complementary feeding in gradual steps starting from *Phalaprasana*, then *Annaprasana* and then finally *Sthanya apananayana* extending from 6 months to 18-24 months of age. Complementary feeding should be considered as a bridge between liquid food and solid food that prepares the child to consume all food prepared at home ie, family pot feeding.

General considerations of complementary feeding

Balanced Nutrition: As per WHO, the energy needs from complementary foods for infants with “average” breast milk intake in developing countries are approximately 200 kcal per day at 6-8 months of age, 300 kcal per day at 9-11 months of age, and 550 kcal per day at 12-23 months of age.¹⁵ Child should be fed with balanced diet which offers 55-60% calories from carbohydrates, 10-12% from proteins and 25-30% from fat. Most of our traditional foods are bulky and a child cannot eat large quantities at a time. Hence, it is important to give small energy dense feeds at frequent intervals to ensure adequate energy intakes by the child. Cereals in general provide about 350 calories per 100g and are poor sources of protein. Energy density of foods given to infants and young children can be increased without increasing the bulk by adding *snehadravyas* like oil or ghee in every feed. Fat is a concentrated source of energy and increases energy content of food without increasing the bulk. Sugar and jaggery can be added in infant foods. Amylase rich foods reduce the viscosity of the foods and therefore, the child can eat more quantities at a time.¹⁶ *Kashyapa* suggests feeding the child with meat of certain birds and with variety of foods to ensure that protein and other nutrient needs are properly met. Pulses which are rich sources of protein are to be given in appropriate quantity. Cereal- pulse mixture can be given in the ratio of 2:1. Fruits and vegetables should be given daily to prevent deficiency of vitamins and minerals. To the child having *pitta* predominant constitution, *Mrdvika* (grapes) with honey and ghee can be given and to child with *Vata* predominant constitution, juice of *Matulunga* (Citron fruit) can be given.¹⁷ In *Ashtanga Hridaya* it is suggested that child should be fed with *laghu* (easily digestible) and *brimhana* (nourishing) diet along with milk.

Consistency: Gradually increase food consistency and variety as the infant grows up, considering the his/her requirements and abilities. Infants can eat pureed, mashed and semisolid foods beginning at six months. *Kashyapa* has suggested feeding of various fruits in the 6th month (*Phalaprasana*) which can be given as puree or in mashed form. By 8 months, most infants can also eat finger foods. And by 12 months, most children can eat the same types of foods as consumed by the rest of the family. Foods that can cause choking such as nuts, grapes, raw carrots should be avoided. For small children, the food should not contain particulate matter that may trigger gag reflex or vomiting. Thin gruels do not provide enough energy; a young infant particularly during 6-9 months requires thick but smooth mixtures.¹⁸ Food that sticks on to

spoon is the right consistency. *Kashyapa* suggests that after eruption of teeth or in 10th month, feeding of cereals (*annaprasana*) should be done after making food soft in consistency by mashing(*sumrdidam*).¹⁹

Quantity :At 6 months of age, feed should be started with small amount as much as 1-2 teaspoons and the quantity is increased gradually as the child gets older and starts to accept food better. *Kashyapa* suggests that quantity of food to be given to the child should be equal to size of thumb in the beginning and should be fortified effectively. Child should be given time to adapt gradually from smaller quantity to larger quantity.

Frequency: An average healthy breastfed infant needs complementary foods 2-3 times per day at 6-8 months of age and 3-4 times per day at 9-24 months. For children of 12-24 months of age, additional nutritious snacks such as a piece of fruit should also be offered 1-2 times per day. If energy density or amount of food per meal is low, or the child is no longer breastfed, more frequent meals should be provided.²⁰ When semisolid foods are being introduced, *Kashyapa* has suggested feeding the infant 3 to 5 times daily and after that, congenial diet should be given to the child with a gap of one or two periods giving consideration to place of living, metabolism, strength and time factor.²¹

Hygiene: Good hygiene and proper food handling should be practiced to prevent children from infections and malnutrition. Hygienic practices should be followed during food preparation, storage and feeding. Feeding the infants and children should be an active, engaging and interactive affair.

Ayurvedic complimentary foods

Weaning foods should be acceptable culturally, available locally, inexpensive, may be home made, clean and hygienic. The foods should be suitable to child, rich in energy and nutrients, prepared easily and easily digestible.²²

Acharya Kashyapa has mentioned that after 12th month, child should be fed with gruels prepared with husk free *Sali* and *Shashtika* rice, mixed with oleaginous substances and salt. Rice (*Oryza sativa*) is rich in carbohydrate and also contains vitamins and minerals like Iron, Zinc, Calcium etc. It is a good promoter of nourishment and is easily digestible. *Godhuma* (Wheat) and *Yava* (Barley) powders can be cooked and given to the child according to congeniality. *Godhuma* (*Triticum aestivum*) contains carbohydrates, proteins, fatty acids, minerals etc and has body nourishing and immunomodulatory actions. *Yava* (*Hordeum vulgare*) contains starch, sugars, fats, proteins and glycosides. It imparts strength and stoutness to body. Gruels prepared out of these cereals can be given to the child with proper fortification of nutrients. *Vidanga* (*Embelia ribes*) cooked with salt and oleaginous substances is also beneficial to the child and in one having diarrhoea, *Kodrava* (*Paspalum scrobiculatum* Linn.) should be mixed.²³ *Vidanga* is beneficial in treating helminthic and other gastrointestinal disorders. *Kodrava* or Kodo millet is a good substitute for wheat or rice and is rich in fibre content. It has good antioxidant activity which helps in managing persistent gastrointestinal disturbances. Adding *lavana* to food improves palatability, kindles digestive fire and increases bioavailability. Energy density of the food is increased by adding *sneha dravyas*.

Acharya Vagbhata has prescribed various nutritional supplements in the form of *Modaka* (sweet balls) to cope up with the nutritional deficiencies and other gastrointestinal related disorders arising during weaning period. These are preparations specially developed to meet the nutritional needs of the infant as the usual family diets in our country are often inadequate for proper growth of the child.

Priyala Majjadi Modaka- This weaning food can be used for improving infant's nutritional status and is prepared by using powders of *priyala majja* (*Buchanania lanzan*), *yasthimadhu* (*Glycyrrhiza glabra*), *laja* (rice pops), *sitopala* (sugarcandy) and *madhu* (honey). It is easily palatable and is rich in nutrients. Both *Priyala* and *Yashti* are sweet in taste and pacify *vata-pitta*. They have nourishing properties of all tissues and promotes strength. It is called as *Preenana Modaka*.

Dhatkyadi modaka- It is prepared with *Dhatakpushpa*(*Woodfordia fruticosa*), *Sharkara* (sugar candy) and *Laja*(rice pop) and is good in children who suffers from repeated attacks of Diarrhoeal disorders as it is having antihelminthic, constipating , anti bacterial properties.It is known as *Samgrahi modaka*.

Bala Vilvadi Modaka –It is indicated in infants with weak digestive capacity. It is prepared with *Bala Vilwa* (Unripe fruit of *Aegle marmelos*) *Ela*(cardamom), *sharkara* (sugar candy), *laja saktu*(rice pops).²⁴ *Bala Vilwa* is having hot potency and it kindles digestive fire. *Ela* improves digestion and taste. It is called *Deepana modaka*. In all the three nutritional supplements, the ingredients have good nutritional value in addition to their medicinal properties. Adding *ghrita* (Ghee) and jaggery will again increase the caloric value making them energy dense food.

Conclusion

Complementary feeding or weaning is an important intervention in preventing malnutrition in children. After exclusive breastfeeding for 6 months, child should be gradually accustomed to semisolid foods to meet the increasing nutritional requirements of the body.Modifying family food is an effective way of ensuring proper complementary feeding and diversified food will improve the micronutrient status of the child. Infant feeding practices mentioned in *Ayurveda* correlates with the current Infant and Young child feeding guidelines. Complementary and supplementary foods mentioned in classical texts are well enough to provide balanced nutrition for the growing child. Based on the principles of complementary feeding mentioned in *Ayurveda*, infant foods have to be formulated considering current availability, acceptability, nutritional status and cost effectiveness of ingredients. Scientific validation of nutritional supplements suggested in *Ayurveda* is essential for its recognition and acceptance in modern era and thus can bring out a solution for bridging the nutritional crisis commonly occurring during weaning period, in a naturalistic way.

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