

Clinical Review

LACTATION AND ABLACTING

(From practical experience, something to say)

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INTRODUCTION

The goals of a diet for the first year of life and ablacting are to provide an adequate energy intake for the accelerated growth and development of this phase of life, as well as to establish solid eating habits.

The rhythm of physical growth that takes place during the first weeks of postnatal life is not comparable at all to that of the normal healthy subjects of other ages and this high rate of growth exercises a great impact on nutritional requirements. At the beginning a substantial part of energy and other essential nutrients needs, are used in the formation of new tissue (growth).

Toward the 4th month of age, the healthy normal infant has duplicated its weight, and the tissue formation rhythm has decreased enormously; therefore, its global needs for energy and nutrients are used in a great less percentage for the synthesis of new tissue. The nutrients that an infant needs, by unit of corporal size, since the 8th month of age till the year of age are more similar to those needed by preschool children, more that to those required by the infant from birth to its 4th month of age.

During our practice, to establish the feeding regimen of our patients for their first year of age, and to establish when to initiate ab-lactation we rely in our experience, based on the appreciation of these coated differences. Our perspective is based on a twenty-five years experience acquired during a private practice dealing with a socio economic middle class population, according to Mexican standards.

Here we will only state our experience and

opinion about healthy born infants, premature born infants and others with specific feeding or digestive problems, are to be considered other wise, on this paper we do not cover this issues.

We have no doubt that the concepts expressed here about the way in which we take care of the feeding regimen of our normal infant patients can be useful to whom might share in its practice similar settings, as we; nevertheless, different circumstances require different approach and we are conscious that our experience and the feeding regimen that we practice, cannot be applicable to population with different demographic conditions to those of the population that we take care of.

We have a profound respect for all the academic research that has been done about the subjects we deal with in this paper, although, it is to be said that not all this research considers practical experience, and knowledge about some topics, finally become theoretical inquires, from a stand point of view far different from real life.

BACKGROUND

Infant and children nutritional history starts since the apparition of the Homo- Sapiens and follow to present time. The capacity of the species to adapt to new circumstances, as an effect of changes in conditions of life, should be distinguished and differentiate among the ones that have been taken place in the last hundreds of years to those that had occurred various thousands of years ago. The survival of the species requires the care of parents on its progeny so that an important number of descendants survive capable to reproduce¹.

Mothers care to an infant should highly assure its probable survival without diminishing

excessively its maternal capacity to attend her other children, including those still not been born. So for an infant to survive, the mother that breastfeed him should also has to survive and she has to be healthy enough as to take care of her child, which also includes her milk. This would not be possible to be achieved, if to meet the infant needs, the production of adequate milk will lead to an excessive depletion of maternal reserves. For this it should be expected that the evolution processes establish a commitment among the welfare of the mother and the infant, as for siblings already alive or potentially to be born.

Human milk is an excellent food for an infant, although not the ideal. Many opinions consider that maternal lactation provided by a healthy and well-fed woman offers adequate quantities of nutrients and caloric intake for the growth and development of the infant. Those who support this point of view postulate with vehemence that the human race has survived millions of years without vitamin K during the neonatal period or the no need for daily supplements of iron, and argue that the process of lactation has been modified by mankind evolution forces, so that milk of each species is the most adequate one for the feeding needs of its young. Nevertheless, this is a romantic concept that is contradicted with reality. It is not infrequent to observe the serious consequences derived from the deficit of vitamin K in infants breast-feed not receiving supplement of vitamin K in the neonatal period ², Iron deficit can be present in infants fed with maternal milk, not supplemented with minerals ³.

Reasons why the evolution forces have not aimed the presence of specific elements in adequate quantities in human milk deserve to be investigated. Two considerations seem prominent: first, an infant is not an evolution unit itself ^{1,4,5}; secondly, changes on conditions of life may have occurred so quickly (even, some times, important changes in less than 100 years) that evolution forces have not managed to maintain at the same rhythm. Infants that do not suffer illnesses and received an adequate nutrient and energy supplied should be able to reach their potential rate of growth.

A reasonable hypothesis establishes that each infant possesses a genetically determined potential for growth of corporal mass free of grease. According to this hypothesis, the ideal rate of growth is that which generates the greatest

quantity of free grease tissue without providing an excessive quantity of grease. Therefore the growth slightly less quick of the corporal mass free of grease of an infant breast-fed in relation to that fed industrialized milk, suggests that maternal lactation, in spite of its decisive advantages since other points of view ⁶, is less adequate as for to permit an infant to reach its potential rate of growth. It cannot be expected that a woman that subsists with an scarce protein intake will contribute to the best survival of the species if in the intent to cover the protein needs of the infant develops a protein deficit ⁴.

When we acknowledge evolution phenomena that have conducted to the composition of human milk is necessary to show our scarce knowledge of the habits of our ancestors with respect to the diet of her small children. In some current non-industrialize human societies mothers offer their infants pre-chewed food. This practice, although unacceptable for a great deal of people from industrialized human societies of today, has prove to be a reasonably measure which seems to assure a complement to human milk. And to satisfy the infants' needs of energy and specific nutrients.

Therefore it is totally possible that an infant did not depend exclusively on human milk to obtain its nutrients. If this practice existed among our ancestors, would be necessary that their infants assimilated different food originating in the maternal diet, starch included. Perhaps this could explain the presence of amylase in human milk (an enzyme that has been shown resistant to its digestion in the stomach) ⁷ and that permits the correct digestion of starch at an age in which the pancreatic amylase is inadequate. It can be speculated that genetic selection would favor women whose milk contained appreciable quantities of amylase, because infant fed by these mothers would be able to survive with a smaller waste of the mother's energy and nutrient deposits. We should also take in consideration that is possible that our current perspective is more limited than what the main forces responsible for the genetic adaptation were.

LACTATION

Any mom that expresses its desire to breast-feed its baby is encouraged by us to do so, and we give them all our support so that

breast-feeding will be carrying out with satisfaction and without grieving. We do not justify trying to obligate a mother to breastfeed and we are against making a woman to feel guilty because she selected not to breast feed her baby.

From our private practices we have received 95% of patients at birth and we continue seeing them as in well-baby clinic control up to teenagers. Practically 100% of those that we take received at birth are initially put into breastfeeding and about 97% percentage of them remain on it at hospital discharge.

Since the beginning of breastfeeding we offer as an optional backup industrialized milk in a supportive way not as a substitute of maternal milk. Mixed lactation is adopted by 75% of our population and only a 25% chooses a single form of lactation, being exclusively breastfeeding 18%, and formula feeding 7%. Thus, since birth and to the first control visit at 10 days of postnatal age a 93% of the newborns are breastfeed and about 82% received a supplementary formula.

It's a standard procedure that all newborn babies are given vitamin K shortly after birth, preventing this way its deficit, particularly on those cases in which there is breastfeeding alone. In all our hospitals a routine IM administration of a 1 mg of vitamin K₁, is done between 1 to 2 hours after birth.

Most babies are discharge home with their mothers by the 2nd to 3er day after birth, time at which maternal milk is not being produce sufficiently, and although its not so probable for babies that are formula supplemented, we seek to prevent in all cases during the first 10 days of postnatal life, lost of weight and dehydration. Its important to monitor these events, through the information that the mother offers us, the strength with which the baby sucks, the number of wet diapers and the consistency of stools, as well as other minor indicators of poor hydration.

Children that are solo breastfeed are offered an iron supplement in the form of iron sulfate that provides approximately 7 mg/day. Despite some authors do not recommend iron supplementation before 4 to 6 months of age, we have found that as a public health guideline, it seems preferably to begin with this supplementation during the first two weeks of life, since even in the presence of

abundant deposits of iron, a part of the administered will be retained and will help to satisfy the total needs of iron during the first year of life⁸.

Vitamin D is necessary to avoid rickets, and specially for infants of "dark skin", although the regular exposition to sun light should protect children from vitamin D deficit, experience has shown that even where there is abundant sun light, some infants are kept protected from sun and develop rickets, that is why all children that are solo breastfeed should receive a daily dose of 400 IU of vitamin D. There is no commercial presentation that will provide exclusively vitamin D and iron; nevertheless, available presentations are with vitamin A, C, D and iron; and we use them safely. The additional intake of vitamin A and C for this supplementation purpose is unnecessary, but harmless.

In those cases in which the mother's decision has been not to breastfeed her baby, we seek for the mother to establish a link with her baby, as a need for breeding, what improves the bond between mother and child, promoting that the mother would not stop having intimate contact with her child. These cases, aside from what has been said, are undertaken for the context of alimentation, the same as the rest of our patients that are breastfeed and supplemented with formula. Although it is stated that supplementation with industrialized milk during the postnatal hospital stay is associated to an early quieting of breastfeeding, we have not found this relationship. In our experience, supplementation with industrialized milk at this level is a simple support to our practice, and contributes to better install maternal lactation, because mothers are not stressed thinking that their babies are starving and this facilitates the production process of maternal milk. The election of the industrialized milk when supplementation, currently is not a problem, since in general terms commercially available milks adjust to general international agencies specifications making them similar; nevertheless, despite there is to be "equal to equal", there are differences, that serve to recommend the consumption of one from another. It also happens from time to time is the mother who suggests us what milk to handle with her baby, that because of customary reasons, family tendency or even the current fashion and even the way to acquire the milk, situations to which we never oppose and we backup the mothers petition and desire. Approximately a 90% of our patients adopt the industrialized supplementary milk that we propose.

Our recommendation for mothers that start with breast-feeding and formula supplementation, is

that they should alternate their breast in each and every feeding, offering it for at least 10 minutes each side, and take another 10 minutes turn for bottle supplemented formula. The feeding rhythm is established on schedule for each 3 hours, from time finishing the last feeding period, with not more than a total 30 minutes duration for the overall period of feeding and with the interpretation that a "free demand" is in relation to quantity of intake and satiety, not to frequency of feeding, avoiding by all means to fall in any form of forced feeding, that way we honor the infants attitude to stop eating when he shows the slightest sign to do so, without pushing him for a little more. Parents are to be aware that their baby does not have to finish the entire bottle. . We prefer to establish a feeding schedule then to feed the infant before the elapsed period of 2:30 to 3:00 hours; every time he cries or when it is interpreted that he is hungry, this procedure establishes feed moderation, habits that at least gives the theoretical probability of order, education and diminishes the risk of obesity.

Using industrialized formulas enriched with iron, that fulfill general specifications, there is no need for vitamins or mineral supplement. In the last 20 years milk industry has developed milks of different composition for different phases of growth and development of infants, as well as for different digestive needs and with in this escalation, the initiation milks before known as "maternally-like", second stage milks, continuity milks and those the one year and older for growth; as well as the supporting milks without lactose and the recent ones for GER and hypo-allergenic.

In our practice we substitute the "initiation milk" with one of second state, when the infant surpasses 6 Kg of weight, not when he reaches 6 months of age; we have seen that the feeding moderation is easily reached with this change, without arriving to a point where the infant requires an intake of more than 8 ounces to feel satiety. When the infant reaches a 10 Kg weight we substitute the second state milk by one of continuity, which more or least correlates to year of age. In special cases the use of the lactose free milks or anti-reflux, we start with them early and keep them according to the individual needs many times until the infant is 10 Kg, and then we switch to continuity milk.

Frequently, except in very rare occasions, during the course of the first three months of the infants postnatal life, we introduce a supplementary

diet; being so, that the replacement of the initiation formula by the second state and continuity formulas, are carried out without depending from milk as the only food stuff; at this point is not milk intake the most important, what is relevant is the supplementary diet.

Finally, in relation to those mothers that from the beginning have breastfeed their babies, we encourage them to continue doing so, as long as they want to, or up to where there breastfeeding capacity or individual commitments allowed them. We see that is especially difficult for working women to breastfeed outside of its home. A 50% of the women that initially chose to breastfeed their children, continue doing so by the 6th to 8th month of their infants age, and about 50% of women that breastfeed in combination with a supplementation formula, will abandon breastfeeding at the 3rd to 4th month of age. As opposed to those reasons coated through the literature, that mothers offer to justify stopping breastfeeding, we have seen that in our population, the reason is: because they believe is convenient to their personal condition, being one more time this decision the expressed election of the mother, having been lactation up to that moment, an extraordinarily and gratifying experience, in most cases.

ABLACTING

Ablacting constitutes a process that begins when breastfeeding and formula feeding are supplemented with other foodstuff different then milk. Although the term ablacting literally means cease of lactation, in practical tens this really never happens.

The change to solid food (baby food) should be a gradual process that can last several weeks to months from the moment in which the infant shows the required that will guide as to initiate this process. The child and its mother should determine the exact moment; the age by itself is not alone a good guide. Ablacting, in these terms, plays an important role in the development of the chewing and possibly in the subsequent capacity to articulate words. Infant's late ablactated can become less receptive to the new flavors. The limitations of the digestive function of infants do not constitute a valid argument against the supplementary diet during the first months of life.

Tests that the infants can tolerate baby food before 3 to 6 months of age have been obtained from the general experience, given to many infants' different products as baby food during the first weeks of the life⁹. At least one theoretical objection exists for giving supplementary baby food during the first months of the life, and that is the gastrointestinal tract for macromolecules; nevertheless, unless an infant has a marked family history of atopy, not even this consideration can be decisive¹⁰.

The main objection for the introduction of a supplementary baby food diet before the 3rd to 4th month of age is the possibility that it could interfere with the establishment of good eating habits and contributes to overfeeding the infant. Feeding with spoon in the first months of life can be carried out when the infant communicates with who feeds him, and in this way a forced diet is avoided. Baby food feeding should fulfill a role so much educational as nutritional. Infants should have a good neuromuscular control of head and the neck¹¹, to be able to communicate with the person that feeds him, and to show his desire to eat with corporal movements toward the food, opening the mouth and doing sonorous signs, or to show its disinterest by the food arching the back, withdrawing the face of the spoon or crying. Until the infant can express these reactions, to give him baby food can represent a type of forced diet.

Ab lactating is initiated when small quantities of smooth and soft baby food are introduced to the baby's mouth. We recommend to initially offering: one to five baby spoons with gradual increments; given in a meal before breastfeeding or formula feeding, with a plastic protected spoon commercially available to feed babies. Never add solid foodstuff to the formula bottle, place small quantities of the baby food in the baby spoon. Many babies give the impression to reject the baby food, when start feeding to its mouth, this relates to its ability to move the tongue and synchronize swallowing, conditioned to the action that carries out for sucking, where tongue elevates toward the palate and descends forward sending food outside their mouth ("spits"), having to reverse this movement with the elevation of tongue but shrinking it to retain the baby food in the mouth and swallow it. The repeatedly experience of the baby to feel in his mouth with food, gives the necessary ability to manage and swallow, food in its mouth. Once the baby develops its ability to be fed by spoon, is necessary to increase quantities, slowly, according to the number of meals and to the variety of foodstuff introduced.

To feed and the consequences of feeding on growth and development are transcendental issues in pediatric practice. What infants eat and how he eats? are conditions influenced by fashion, the environment and by ethnic background. Nevertheless, there are facts that have to be sustained despite fashion, environmental trends or cultural and ethnic practices. A healthy term infant, whether he is breast-fed or formula fed, requires from 95 to 125 kcal/Kg/day during the first 6 months of life. From 8 to 12% of these calories should be originating from proteins and from 30 to 50% of greases and the rest carbohydrates¹². If these requests comply, then it should be expected that the healthy term infant would gain in growth between 25 to 40 g/day during the first 3 months and between 15 to 20 g/day in the seconds 3 months of life.

There is an extensive range of foods available for ab lactating, whether commercially ready to serve or that can be preparing at home. Commercial sold baby food is safe, well preserved and are salt free, glutamate free and nitrates free (as opposed to the canned food for adults). Food prepared at home can be cheap and healthy, and offers parents great autonomy. When food preparation is made at home, food does not have to be sterile, but should be free of contamination. Infants refuses home made food is because preparation has being done for the taste of the mother and not according to the needs of the infant consumer. It has been shown that the food prepared at home comes to have 10 times more salt then the commercial sold food and this can represent a 65% more of the suggested by the National Academy of Sciences of the United States of North America.

The selection of the type of food is the most important aspect of a nutritious diet. To structure a diet, that include maternal milk and/or industrialized formula milk, is of vital importance for the infant continues growing and developing in a normal condition and for him to gradually learn to accept flavors and textures. Initially is important to develop his sense for taste and smell.

From a biological point of view, the sense of taste permits us to detect and discriminate among diverse food, to select a nutritious diet according to the fluctuations of metabolic needs. The sense of the taste initiates, maintains and finishes intake. Since the beginning it should be emphasized that people eat food not nutrients and that taste system is designed to respond to complexes chemical stimuli. The selection of a nutritious diet is the result of an appropriate selection of food, not of the selection of nutrients. Taste indicators regulate the quantity of food intake and the size of their portions¹³.

The sense of smell occurs when molecules activate receptors of the olfactory epithelium located in the dorsal portion of the nasal cavity, in the septum and in part of the superior turbinate. The smells get to the olfactory epithelium through the nose and retro-nasal through the mouth when the food is chewed or compressed between tongue and palate. The composed odors displace upward the mouth to the naso-pharynge, and are taken by the olfactory cells that through its axons connect with the olfactory bulb, where they make synapses. The olfactory tract is projected downward through the medial portion of the olfactory bulb toward the anterior olfactory nucleus, the olfactory tubercle, the pre-pyriform cortex and the amygdala; many of these structures constitute the limbic system that processes emotions, memories and signs of smell. The olfactory information is transmitted finally to the hypothalamus. All this anatomical projection emphasizes the importance of the smell in the act to eat and in the answer of pleasure^{14,15}.

The term "food acceptance pattern" can be use to frame the preferences of food, the selection of food and the quantity of food that an infant consumes. Discussion will continue focused mainly in the contribution of early learning and experience toward the development of the "food acceptance pattern". Most of this learning involves the formation of associations among food and the context and consequence to eat it. The formation of associations among food and post-intake consequences to have eaten it includes post-intake signs of hunger, satiety, and nausea; also constitute the food acceptance pattern of an individual. This knowledge of the ways infant learn early and experience acceptance to different types of food, gives a base for the development of the approach to infants' feeding so he can adopt a healthy "food acceptance pattern"¹⁶

Children are happily ignorant of the energy content and the value of nutrients in food and do not doubt in expressing its acceptance or rejection. Facial expression reflects acceptance or refusal and originates when a basic flavor awakes (sweet, sour, bitter, salted). At birth there is a positive facial expression respond with all sweet flavored and a negative expression to bitter and sour flavors; by the 4th month of age, begins to show preferences for salted. The facial expression reflects the infants answer to sweet things, sour things and bitter things and is interpreted ambiguously by adults, so when the infant test sweet substances, the observation that is made about it, is: "see, he likes it ", and for its answer to sour and bitter, is: "he does not likes it". As adults we do interpretations of facial expressions and gesticulations that the infant does to food, and these interpretations become the base reference for us

to decide if we should continue giving a certain food, or stop feeding it or if it is time to tested with another¹⁷

To have a successful transition from a basic milk diet to a diet supplemented with baby food, the infant has to learn to accept part of the food that is offer to him. This is a dilemma: despite that we omnivorous required variety, new food is not easily accepted. The dilemma of omnivorous is particularly obvious in the development of the food acceptance pattern of an infant, for him all food is new and initially unknown. The refusal to consume new foodstuff has been called "neophobia". Research dealing with the factors that affect the neophobic answer has begun to understand how is that this response of refusal can be changed in base to experience. It is seen that many of this initially reject food by children, finally they will be accepted if enough opportunity is given to him to taste this food under favorable conditions^{16,17}

Repeated opportunities to test food increases acceptance, changes in food acceptance by children occurs slowly and can require between 8 to 10 expositions, before obtaining definite change acceptance. Nevertheless, children are not given the opportunity, frequently, to repeatedly eat new food, giving the adult an erroneous feeling about the refusal to new food. According to these interpretations, food is not offered again and the infant does not learn to accept new food, labeling these children as with "loss appetite" or "difficult eating". Despite preferences for sweet and refusal for sour and bitter that are present since birth, this reflex respond, initially not learn, is modified in children to who is given them the experience to eat and to taste food. The schedule of several meals a day, gives the opportunities to acquire learned experience to forms the food acceptance pattern an infant.

According to all this theoretical framework, it is worth to consider feeding through ablactating as a development process that is given in steps and that as such should be undertaken, since the phase of milk dependence as only food, to the phase in which the child can share food with the rest of the family. Selection of food should vary depending on the phase of growth and development child is going through and the energy required for its age and his exercised activity.

Under these conditions can be estimated that a first phase diet requires approximately 700 kilocalories per day and about 13 g of proteins, in a second phase diet it will need 810 kilocalories and 14 g of proteins and for a third phase 950 kilocalories and 14 g of proteins^{18,19}. For or patients we offered them 2 menus per phase, to satisfy the nutritional needs for growth and development of the pediatric population we handle.

For the first phase, that we consider highly educational, we offer a start menu of smooth texture food, a single ingredient of easy digestion, composed by maternal milk and/or formula milk, rice and oat cereal, pap fruit or juice and natural yogurt, distributed in 5 meals during a day (breakfast, lunch, main afternoon meal (Mexican), snack and supper). In a second menu, still related to the first phase, taking care of the smooth texture and the property of easy digestion, we begin to associate ingredients, and eliminating one meal (afternoon snack) and we give no milk for lunch, keeping milk on the rest (breakfast, main afternoon meal and supper), with cereal, fruits juice, pap fruits, greenery and fruit juices, vegetable creams and flavor yogurt or baby cream cheese. We introduce jelly as a trainer to stimulate synchronize movements of tongue and throat, for handling food inside the mouth.

Second phase, should be oriented to approach a physiologically mature child, sufficiently to consume vegetable or animal origin foodstuff, eager of new flavors, more textures and greater portions, scheduling 4 meals a day (breakfast, lunch, main afternoon meal and supper). Within a third menu it is provided maternal and/or formula milk, cereal, fruits juice, pap fresh fruit of season, greenery and fruit juices, tuber cream soups (potato, sweet potato) and legumes cream soups (corn, beans, lentil, chickpea), meat pap of: chicken, turkey and veal, alone or with vegetables and flavored yogurt or cheese cream. A fourth menu provides essentially the same thing, opening more options with cream soups, introducing: broccoli and mushrooms and pap foodstuff of animal origin, such as: lamb, ham and bacon and desserts as pudding, custard and baby crackers are added to the diet.

For the third phase the main source of calories and proteins is given through the supplementary diet to guarantee a good nutrition, what makes necessary to achieve suitable combinations of food. In a fifth menu we keep the 4-meal schedule and the basics of the fourth menu, adding to soup creams other kind of beans and in the animal origin products: liver. Finally a sixth menu, similar to the fifth one, where boiled egg is introduced (only yolk) and from animal origin food is fish. Subsequently child will begin its integration to the family diet, avoiding always the greases, spicy and seasonings foodstuff

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