A guide to developmental milestones in toddlers

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This does not come with an owner's manual!

Parents are often unsure about when their young child should be moving on through the stages of feeding and food acceptance. This session introduces the ITF's new resource for 2014, which will provide an understanding of the stages healthy, full term infants and toddlers will go through.

Objective

- was to produce an information pack describing evidence-based developmental stages relating to feeding, eating and drinking which could be used both by health professionals in advising parents, and by parents themselves

How it will be used –

As an interactive visual aid with supporting text and references:-

- To inform advice from health professionals about infant feeding skills and feeding and eating behaviour
- To inform advice from health professionals about good practice for parents in establishing positive mealtimes
- To inform parents and health professionals about when there might be a need for specialist intervention in establishing feeding, eating or drinking .

The basic stages will also be available in poster format.

Methodology

Literature searches were carried out to identify evidence bases in the four following areas of research relating to eating, feeding and drinking in infants and toddlers:-

- *Skills related to feeding and eating*
- *Feeding specific skills*
- *Taste and food preferences*
- *Appetite regulation*

These searches included topics such as oral-motor skills relating to feeding, acceptance of lumpy textured solid foods, and the development of the gag response.

The literature base upon which the developmental stages have been based has now been reviewed by a panel of expert health professionals. It has also been submitted for external review, by health visitors, speech and language therapists, psychologists and paediatricians who are expert in their field.

I have used mother's comments form internet support groups to show how the Milestones resource might be used

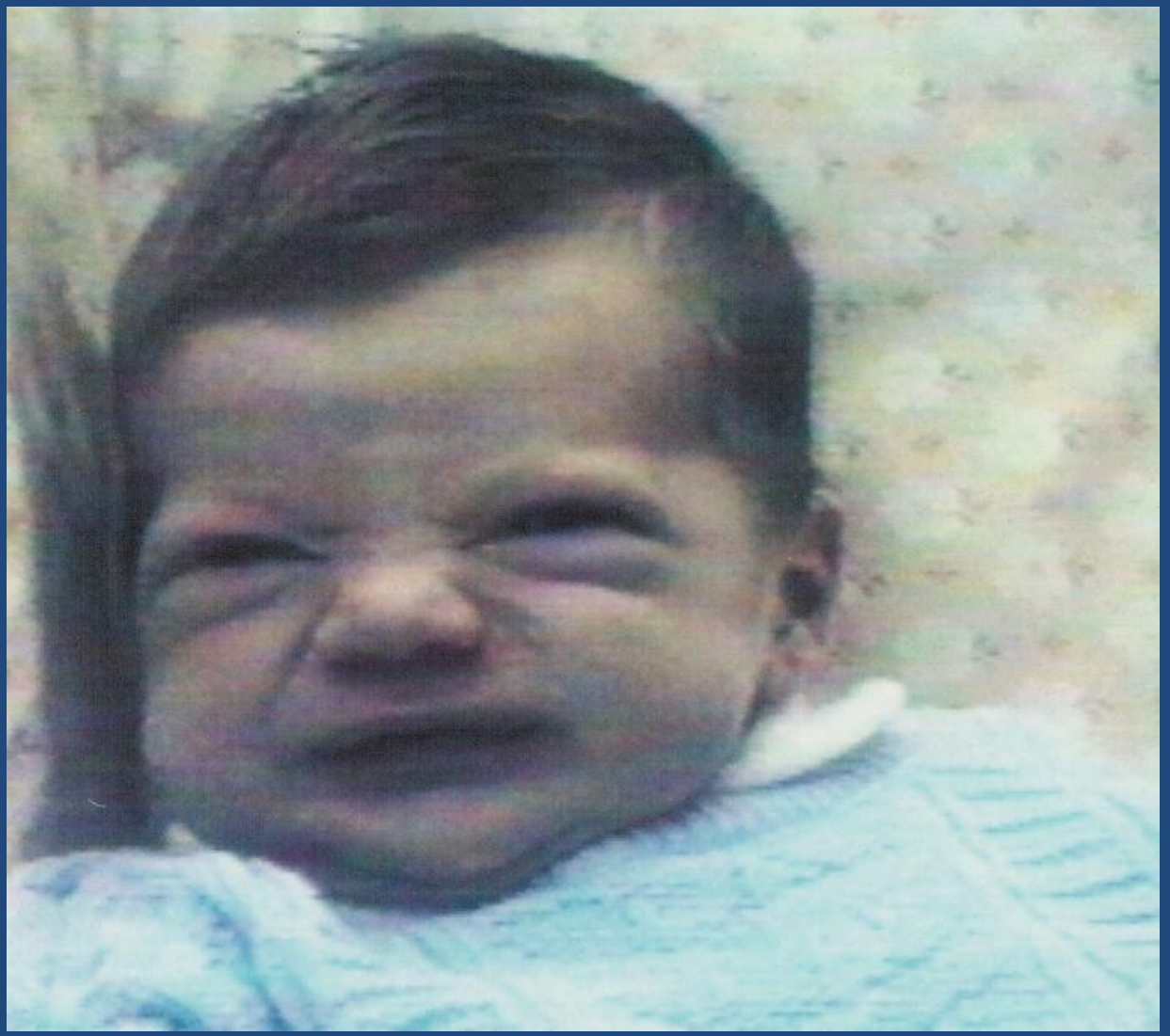
Mother's advice or requests for advice are given with highlights in ***red***

Text taken from the Developmental Milestones document is highlighted in ***gold***

- **There are four areas to consider.....**
- **1) Development of skills related to feeding and eating**
- ***Facial expression***
- ***Recognition of known experience***
- ***Holding and mouthing***
- ***Sitting without support***
- ***Discriminating facial expression***
- ***Interaction with others***
- ***Imitation of other's behaviour***
- ***Pointing at objects***
- ***First words***
- ***Categorization of objects by sight***

Innate taste response - Sweet

Bitter – and the same response as a rat pup!



The innate smile - not wind!

“ all she needs is more milk - increase her to 8oz feeds.

at 4 months babies have a growth spurt which can often cause them to start waking in the night when they had previously slept through - not a sign that they need weaning, it is a sign that she needs more milk.

chewing her hands, watching your food and making mouth actions - not signs that she needs weaning - all are just normal developmental stages.”

Internet source

Imitation of mouth movements –from birth

Sucking fists. The newborn infant can open their mouth in readiness to suck their fist (Blass et al., 1989), *and this behaviour is more likely to happen if the infant is hungry.*

- **2) Development of feeding specific skills and physiology**
- ***Sucking***
- ***Swallowing***
- ***Sucking fists***
- ***The gag reflex***
- ***Tongue control***
- ***Opens mouth in response to spoon approach***
- ***Clears spoon with top lip***
- ***Tongue movement***
- ***Chewing***
- ***TOOTH ERUPTION***
- ***DEVELOPMENT OF THE DIGESTIVE SYSTEM***
- ***SELF –FEEDING SKILLS***
- ***Biting***
- ***Infants holds food hand***
- ***Feeds self from spoon***
- ***Drinks from sippy cup***
- ***Drinks from open cup***

"As I understand it the only genuine signs they are ready is being able to sit with minimum support, being able to get food into their own mouth and having lost the tongue reflex that pushes anything that goes into their mouth out.

We started at about 23 weeks doing blw. DS was sitting really well and everything he grabbed went into his mouth. We gave steamed broccoli and carrot. I didn't know if he'd lost the tongue reflex but figured if he wasn't quite ready he would just spit everything out anyway. I understand though with **spoonfeeding purees and rice** **you can get the baby to eat and swallow even though the tongue reflex is still there trying to push it out."**

Internet source

- Sitting without support. Infants can hold their head up and begin **to** ***sit without support between 4 and 6 months*** (Rochat & Goubet, 1995).
- Tongue control . Moving the food appropriately to the back of the mouth can be observed ***in response to spoon feeding from as early as 2 months*** (Carruth, 2002)

- If pureed foods are introduced early in the 4-6 month introductory period, when the infant is learning good tongue control ***then some tongue protrusion is often noticed; this may look as if the infant is pushing the food out of the mouth.***

“ I'm a HV. Wait till 6 months, as all the signs she is showing are likely normal developmental stages**. At 6months, your DD tummy will be ready to break down the food using enzymes that aren't mature currently. Also, her liver won't be functioning fully so will struggle to metabolise anything other than milk.**
If she's hungry, give her more milk.”

Internet source

- Digestion and Absorption

  The enzymes produced by the salivary glands, stomach, liver and pancreas that are needed to digest solid foods develop in infancy and by the ***age of around four months*** they are sufficient to digest non-milk starch, proteins and fats (Michaelson et al, 2000).

- Renal (Kidney) Function

  The ability of the kidneys to excrete large amounts of minerals and salts ('solute load') is limited in early infancy***, but adequately developed between four and six months*** to cope with complementary foods, (Michaelson et al, 2000).

- **3) Development of food preference ; acceptance and rejection**
- *Inherited factors in taste acceptance*
- *Learned preferences before birth*
- *Inborn taste preferences*
- *Inborn preference for energy dense foods*
- *Breast feeding and food preference*
- ***Introduction of complementary foods***
- *Learned taste acceptance*
- *Inherited factors in texture acceptance*
- *Texture acceptance*
- *Texture stages*
- *Disgust and rejection*
- *Neophobic stage – the fear of new foods*
- *Preference for energy dense foods*
- *Inherited factors*
- *Long term effects of early dietary preferences*

" OMG!! my little boy is exactly the same .he's 9 months and since 5 and a half I keep on trying **I have tried everything ..all kind of texture , thickness , combinations nothing works. I hardly manage to give him 1 -2 spoons and this with a fight and that's it.** I am so frustrated I don't know what else to do...I wish somebody could give a solution. what u describe is 100% same situation with me. waking up every 2 hours in the night to bf and all the rest.

- at the 8 month check I had a talk with the health visitor about it but because the last 2 days before she came he was kind of doing a bit better opening his mouth and having some food , she said she'll give me a call in a month time to see how it **goes and if he's still not eating she will refer us to a speech therapist to check his mouth maybe is something wrong** (she said) pointless to say that the opening the mouth and having some(food) stopped very soon and we are in the same situation as before"

- *Internet source*

- Inborn taste preferences. An infant is born with a preference for sweet tastes; ***all other taste preferences are learned*** through experience with foods given to the infant (Crook,1978; Schwartz et al., 2009).

- Learned taste acceptance. ***Infant taste preferences are learned though experience with those tastes offered to them.*** However, it also seems that the earlier within the introductory period an infant is offered food with a specific strong taste, such as vegetables, then the more likely they are to accept the food and that taste (Harris, Thomas & Booth,1990).

To regulate intake -

- ***When fed complementary food***, ***the infant can turn their head away from the spoon,*** spit food out, show a disgust facial response, block their mouth with the hand, and cry.
- ***Force-feeding an infant*** or toddler, when signals of dislike or satiety are shown by the child ***can lead to food refusal***, weight loss, and long term dislike of the forced food (Harris & Booth, 1992; Lindberg et al, 1996)
- ***Responsive parents*** react appropriately to these signals by stopping the mealtime or offering food to the infant;

“ There was a flawed report sponsored by Nestlé suggesting 4 to 6 months. Obviously if a mother ebfs until 6 months and then the bab goes onto family food the formula and baby food companies won't make much money from them.”

Internet source

(But -Why do you have to use commercial baby foods before 6 months?)

- It is advised that the infant should not be given foods other than breast milk if possible until the infant is 6 months of age (WHO). However, it is safe to introduce complementary foods from the age of 4 months in developed countries; ***the European guidelines for the introduction of solid foods is therefore between 4 and 6 months,(Agostoni et al, 2009) -*** when the parent thinks that the infant is ready for this introduction.

- In a 2011 survey in carried out in the UK, approximately ***80% of infants had been given their first foods by the age of 5 months*** (DNSIYC,2011)

- There is no evidence to ***support the introduction of pureed foods on a spoon as the first foods offered to an infant***, nor is there any evidence of advantage to the infant of being ***offered finger foods as a first food.*** It is however easier to introduce a range of tastes, and foods of ***appropriate dietary balance if pureed foods are offered first,*** and infants are able to cope with this texture without needing to use more complex oral- motor skills that are required for more solid foods (Wilson et al., 2012).

“ My daughter didn't get her 1st tooth until she was 11 months old & was able to eat all the meals we were eating as we did BLW from 6 months, including meat which she's had every day since 6 months. She's only gagged 3 times & was able to cough it up each time without bothering her & would continue eating. Apples can be quite hard as a 1st food. I would try something softer like pear, peach, plum or nectarine. “

Internet source

- ***The first tooth usually appears at around 8 months (age range 6-10 months)*** and all teeth are usually present by the age of three years (www.ada.org/goto/jada).

I didn't feel worried when she was feeding herself the cucumber. Anyway, I THINK she was choking. I say *think* because I didn't hang around to find out, I just grabbed her out of the high chair & did the textbook stop-choking procedure. A small, soft bit of cucumber fell out of her mouth and that was that. She cried for a moment when I brought her back into an upright position but that could quite easily have been from shock at the way I'd suddenly handled her like that. Otherwise she seemed quite unperturbed afterwards. **I, on the other hand, am now terrified of continuing BLW.**

Internet source

- Chewing efficiency develops in response to different textured foods given to the infant, so that most infants can cope with ***soft textured foods between 6 months and 1 year*** (Gisel, 1991).

- Children who are introduced to solid textured foods at around 6 months***, will be competent at chewing at 12 months (Wilson et al., 2012),*** and able at 2 years, to cope with most foods which might be offered to them as part of a family meal (Wickendon, 2000) .

- The Gag reflex . This ***is shown in newborn infants*** in response to touch and can normally be triggered by touch halfway back on the tongue (Wolf &Glass, 1992).It is ***a protective reflex*** that prevents the ingestion of too large pieces of food, and can be seen as a response to touch to which the infant is not yet used.

  As more touch- stimulation takes place within the mouth then the gag reflex usually declines. However***, it can still be seen in infants of 6 months and over, when they are introduced to lumpy solids foods.*** This is because lumpy solid foods are moved straight to the back of the mouth rather than to the sides of the mouth before chewing motions are learned (Gisel, 1991).

Texture stages:-

- Puree
- Mash – do we need this stage?
- Lumpy solids – what does this comprise?
  - soft lumps in suspension
  - hard lumps in suspension
- Finger foods
  - bite and dissolve
  - bite and mush
  - bite and chew

Table 1: Food Textures

Progress through food texture	Description	Examples
Smooth puree	Quite runny or smooth with no lumps	Pureed stewed fruit Pureed stewed vegetables Weetabix soaked in milk or fruit juice Fromage frais Smooth yogurt
↓		
Soft mash	Fairly smooth with small soft lumps. It is mashed with a fork rather than liquidised	Banana mashed with a fork Mashed potato Mashed baked beans Scrambled egg Steamed fish Dhal – well cooked lentils
↓		
Bite and dissolve finger foods	These dissolve in the mouth and do not need any chewing but do need enough control to hold food in the mouth until it dissolves	Wotsits Skips Quavers Meringue Weeny wotsits Monster munch Pink wafer biscuits Ice cream wafers Most sponge fingers Rice cakes
↓		
Bite and melt finger foods	These melt in the mouth, similar to bite and dissolve, but coat the mouth more	Maltesers cut in quarters Chocolate buttons
↓		
Bite and soft chew	These need some preparation or munching in the mouth before being swallowed	Very ripe peeled fruit e.g. pear, melon, avocado, peeled grapes cut in half Soft pieces of cooked potato, sweet potato, carrot, beetroot, soft chips, cooked florets of cauliflower/ broccoli Mini pasta shapes Soft biscuits e.g. malted milk, Rich Tea, digestive biscuits Sandwiches made with soft white bread (crusts cut off) and smooth fillings e.g. cheese spread, butter and marmite, hummus Soft cake e.g. Madeira cake Pancakes Cheese triangles, cubes of soft cheese Small pieces of well cooked fish, corned beef Fishcakes (you need to take the coating off)
↓		
Bite and splinter	Need a little more chewing before being swallowed	Bread sticks Cream crackers Crisps Poppadums Ryvita Hula hoops
↓		
Bite and lump	These need good chewing skills and are usually the last foods to be mastered by most children	Raw apple Chicken nuggets Whole grapes Crusty bread Pizza Sausages

" Ds1 is a fussy bugger who was BLW. He ate everything til about 22 months when he started refusing foods. He's 3 now and eats very little fruit, meat or many vegetables.

I think they are what they are, no matter how they were weaned."

Internet source

“ I think that fussy eating in toddlers and older children is about control, attention and independence. I don't think it has anything to do with weaning method or whether the child actually likes or dislikes particular flavours. They reach an age where they want to assert themselves and food is one easy way to do this. And it often yields results for kids in the form of increased attention, offers of other (favourite) foods, and general fuss”

- *Internet source*

- The neophobic response

  It is relatively easy to introduce new foods to infants under the age of 1year, however***, after this age, toddlers are often very reluctant to accept new foods*** and, often refuse to eat foods that they accepted before (Brown & Harris. 2012; Pliner & Hobden 1992).

This rejection of new foods and of previously accepted foods peaks at about the age of 20 months. The food is rejected on sight, and it is thought that this might have been of evolutionary advantage, as toddlers became more mobile.

At this age***, safe foods and accepted foods have to be an exact visual match***, so that fruit with marks on, or toast that is too brown, will be rejected. Foods that are not an exact match might be poisonous or rotten

These are both spaghetti bolognaise, but they look very different.

Hiding it will not work!

4) Regulation of appetite and intake

- ***Partial and good regulation in infancy***

- ***External cues to eat and responsive feeding practices***
- ***Over –riding internal regulation***
- ***Signalling hunger***
- ***Signalling satiety***
- ***Responsive parenting***
- ***Prompting***
- ***Pressure to eat***
- ***Restriction***
- ***Portion size***

"The thing here is to be very careful, if he's increasing his milk intake its because he's having a growth spurt and needs that extra milk...if **you fill him up on solids** which don't provide anywhere near as much calories he may drop his milk intake (and lower your supply) **and possibly loose weight or stunt his growth spurt."**

Internet source

- An infant can begin ***to regulate the calorie intake of their milk to accord with their growth needs from birth*** (Fomon et al., 1975). At first this compensation, taking more or less feed according to the calorie density /energy intake of the feed offered, is only partial. However, as the infant gets older (6 weeks), so this ability improves and infants can regulate their intake well.

- Good regulation. ***Four to six month old infants adjust their energy intake when complementary feeds are offered to them, so that they do not take in more food or milk than they need*** (Cohen et al.,1994). But this means that infants who do not move on to complementary feeding may continue into the second year still just taking mainly milk feeds, and it is not easy to move them away from milk feeds on to complementary foods (Mason, et al., 2005,Harris 2009).

What will the information look like ?

Key

Prior to Birth - 1 month	1 month - 3 months	3 months - 6 months	6 months - 12 months	12 months - 2 years	2 years and above

Development of skills related to feeding and eating

Includes Facial Expression, Interaction with Others, Imitation of Others, Smells and Tastes, Motor Development of Feeding Skills.

Motor development of feeding skills

Birth

Will bring hand to mouth and open mouth in preparation for suck

2 months

Can hold objects

3 months

Can hold onto objects and put them into the mouth

4 months

Can hold, mouth and show visual exploration of objects

4 - 6 months

Begins to sit with some support and then unaided

9 months

Pincer grasp with finger and thumb

Sits without support

Key

Prior to Birth - 1 month	1 month - 3 months	3 months - 6 months	6 months - 12 months	12 months - 2 years	2 years and above

Development of feeding specific skills

Includes Oral Motor Development, Self Feeding and Eating Preferences.

Oral motor development (function of the lips, jaws and teeth)

Prior to birth

Sucking observed in the womb

Swallowing observed in the womb

Birth

Infant will open mouth to suck fist especially if hungry

The gag response to food and objects in the mouth is observed from birth

Can move tongue in and out, and up and down

2 weeks - 9 months

With the onset of spoon feeding begins to open mouth for spoon

2 months

Can move food from a spoon to the back of the mouth

6 months

Gag response declines as mouth is desensitized; still observed in most adults

Can move food from side to side of the mouth *(from introduction of lumpy solids)*

6 - 12 months

Front teeth arrival

6 - 15 months

Can process small soft lumps in the mouth

7 - 12 months

Can close the lips to clear the spoon

8 months

Some biting movements in response to soft foods *(4–14 months - mean/ recommend 8 months)*

Biting into hard foods

8 - 20 months

Can process larger pieces of soft food

12 months - 4 years

Can cope with most textures offered but chewing not fully mature

13 - 19 months

Side teeth arrival

Key

Prior to Birth - 1 month	1 month - 3 months	3 months - 6 months	6 months - 12 months	12 months - 2 years	2 years and above

Taste and food preferences

Includes Acceptance, Rejection and Texture Progression Stages.

Acceptance and rejection

Prior to birth

Some infants will inherit: a strong dislike of bitter tastes and certain food textures

Some will be more neophobic than others and reject more foods

Birth

Sweet taste preference and some strong tastes developed from amniotic fluid such as garlic and spices

Preference for energy dense sweet and fat foods (continues through childhood)

Birth - 6 months

Some strong taste preferences learned from the taste of milk feed

4 - 6 months

Introduction of complementary foods, taste preferences rapidly learned and easier acceptance of new foods

Key

Prior to Birth - 1 month	1 month - 3 months	3 months - 6 months	6 months - 12 months	12 months - 2 years	2 years and above

Appetite regulation

Includes Signalling Hunger, Satiety, Dislike and Regulation.

Signals satiety and dislike

Birth

Tries and turns head away from nipple

Sucks slowly and stops sucking

Pushes nipple from mouth

Facial expression grimace

4 months

Turns away from spoon

Holds food in mouth

Pushes food out with tongue

Clenches mouth shut

Shows disgust/gags at disliked food

12 months

Throws food

Signals or says 'no' to unwanted/ disliked food

Distracted by toys during mealtimes

The information, supported by photographs, specifically taken to illustrate each point, will be available as an interactive on-line tool, fact-sheets and posters.