



# EATING, DRINKING AND PICKY EATING

Everything you need to know and more

A Parent Handbook by CPAS,  
Speech and Language Pathology Department

# FOREWORD

Do you remember the struggle you had with your child at mealtimes? Difficult feeding behaviours could stem from a mix of developmental factors – such as gross motor development and environmental factors like the seating set-up.

Our Speech & Language Pathology team, led by Ms. Sunitha Sendhilnathan at Cerebral Palsy Alliance Singapore (CPAS) has put in great effort to compile this feeding booklet -

## EATING, DRINKING AND PICKY EATING

*Everything you need to know and more*

to help parents like you understand and tackle feeding difficulties.

The team operates specialised clinics in CPAS, one of which is the Feeding and Swallowing Clinic. The clinic helps clients across different age groups from our CPAS programmes with picky eating, feeding, oro-motor and/or swallowing issues.

With their keen expertise and experience on the subject matter, I am sure you will find the strategies in this guide useful to help make feeding at mealtimes a more enjoyable affair.

I wish to convey my heartiest congratulations and acknowledgment to the team of Speech & Language Pathologists for their hard work in empowering persons with cerebral palsy and multiple disabilities to lead fulfilled and dignified lives.

**Latha Kutty**

Executive Director  
Cerebral Palsy Alliance Singapore (CPAS)

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# EATING, DRINKING AND PICKY EATING

## Everything you need to know and more

Feeding is an act of parental love. It is also an essential life skill needed to nourish our bodies with the nutrition and hydration our bodies require. When problems and difficulties arise during feeding and mealtimes, it becomes stressful and at times a source of frustration for both caregiver and child.

This booklet was written with the intention to empower caregivers with a better understanding of feeding development and the causes of feeding difficulties and mealtime behaviours. Additionally, simple strategies and suggestions are provided to help encourage and support a more positive mealtime experience for both the child and caregiver.

**\*\*The information in this book is to build understanding and acts as a general guide. If your child is already seeing a speech therapist, it is important to check with your child's speech therapist before implementing any of the strategies in this book.**

If your child is exhibiting any of the signs below, please inform your child's paediatrician or your family doctor. It is also highly recommended that a feeding assessment be done by a speech therapist or feeding team to obtain more specific strategies and recommendations to suit the needs of your child.

### Signs of feeding difficulties

- ☐ Weight loss or no weight gain observed.
- ☐ Taking more than 30 minutes to finish a milk feed, snack and/or meal.
- ☐ Avoidance of specific food groups e.g. meat, vegetables, fruits and a small variety (< 20) of accepted/preferred foods.
- ☐ Signs of coughing, choking during and/or after mealtimes.
- ☐ Frequent chest infections.
- ☐ Behavioural issues exhibited only during mealtimes e.g. crying, only wanting to eat foods presented in a certain manner.
- ☐ Eating blended foods after the age of 1 year old or drinking all fluids via milk bottle after the age of 1 year old.
- ☐ Not eating table foods by the age of 2 years old.
- ☐ Meal times are stressful.

# CAUSES OF FEEDING DIFFICULTIES

Feeding difficulties are usually the tip of the iceberg. It is a sign informing us of underlying issues that we cannot see.

## Feeding issues



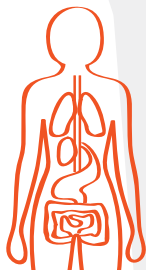
### All muscles

There are more than 50 pairs of muscles involved in swallowing. All of them play a role in ensuring efficient and safe swallows. As they all work in tandem, a problem with any of these muscles will cause a ripple effect resulting in various feeding issues.



### Development

The head and neck anatomical development of the child, including oro-motor, fine motor and gross motor development all have a role in feeding. A setback in any of these areas can cause feeding difficulties.



### All organs

All the organs in the body contribute to the process of feeding in small and big ways. It is important that they work in tandem for feeding efficiency and digestion.



### Learning

As feeding is a learnt behaviour, early feeding experiences contribute to the child's willingness to learn about new foods and develop interests at mealtimes.



### All senses

Our 8 senses contribute to the mealtime experience. Eyes to see our foods. Nose to smell our food. Ears to hear the sounds our food makes. Touch to feel our food. Taste to taste our food. There is also the vestibular sense to help us keep our balance, and proprioception that helps us know where the food in our mouth is. Additionally, there is the 8th sense of interoception that helps us feel what is going on inside our body, like when we feel full.



### Nutritional status

Good nutrition will lead to good growth and muscle strength to develop more complex feeding skills. Inadequate nutrition will lead to reduced developmental skills.



### Environment

The feeding set-up from seating, postural support and the equipment used can help create either an enjoyable mealtime experience or result in a negative one – both of which will influence the child's association with feeding.

# DEVELOPMENT

A baby's head and neck will continue to grow and change over time. The spaces in the mouth become bigger and the cheek pads become smaller over time. These changes will require the tongue muscles to move faster and more accurately. The jaw will also need to maintain stability while doing more complex movements that help with chewing food.

It is because of these growth changes that we have to ensure that the food we give is just the right size and texture for the child's current feeding skill, but it also has to have some challenge to help develop the more complex eating skills.

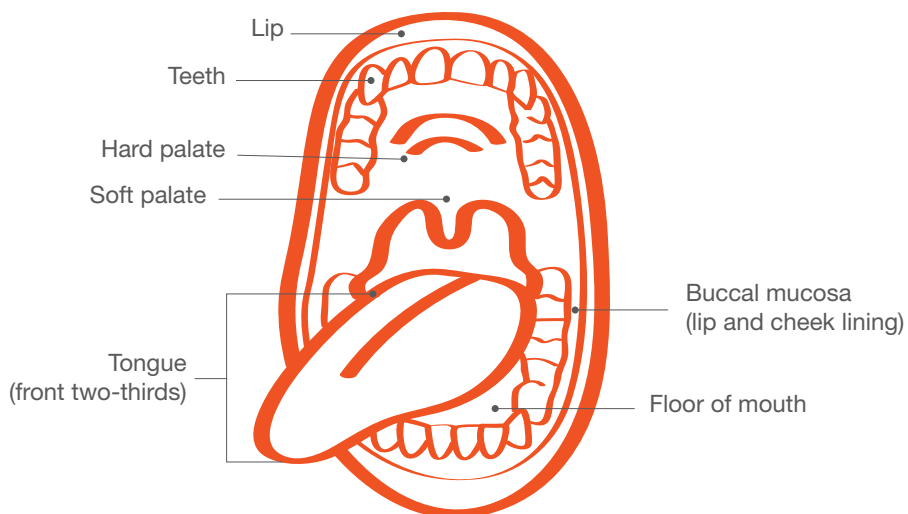
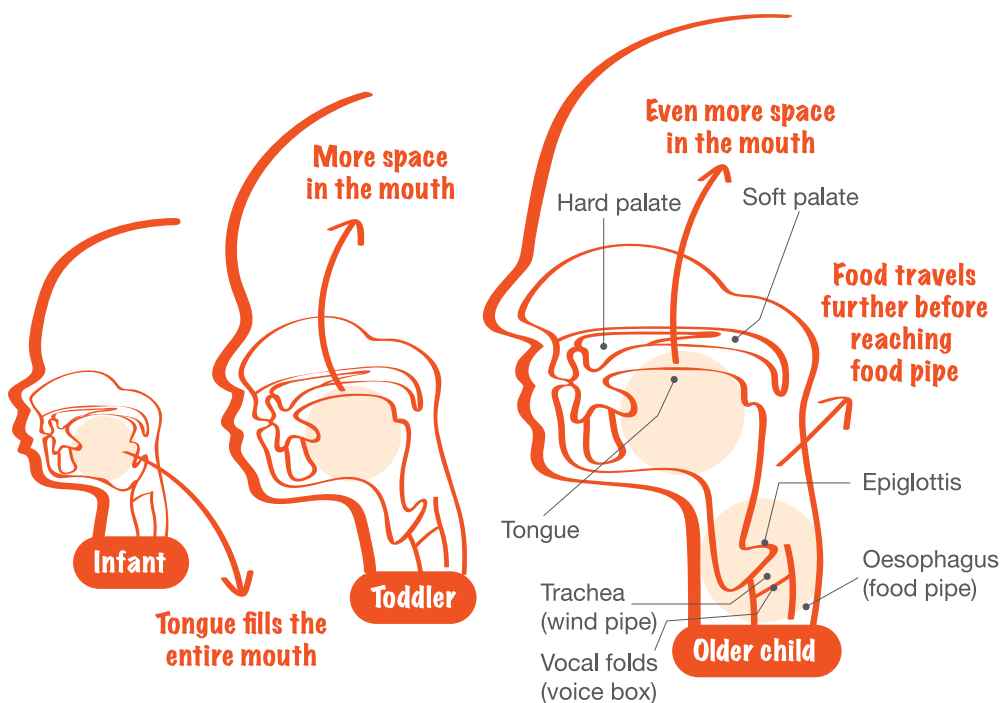
In the timelines that follow, you will be able to see how the lips, tongue, jaw and overall gross motor development change over time, as well as how they change the kinds of food textures that a child will be able to eat during that same course of time.

Please kindly note the ages listed are that of typical development. If your child is known to have feeding difficulties, the time duration to progress to the next stage may be longer, but the course of skill development is similar. If you would like to know more about your child's feeding development and the course it is likely to take, please kindly approach your child's Speech Therapist.

You may also contact the Feeding and Swallowing Clinic at **6585 5631/32** or email **[slp@cpas.org.sg](mailto:slp@cpas.org.sg)**.

You may refer to the diagram of the head and neck anatomy and the mouth while reading segments of this book to help you better visualise and understand the more technical explanations.





# DEVELOPMENT OF LIP MOVEMENTS FOR FEEDING



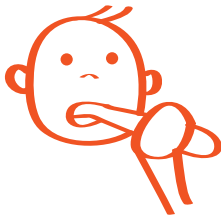
## 4 - 6 months

Lips do not actively close over the spoon, maintains open position



## 8 months

- Lips will close when swallowing
- Dribbling of drinks and thin puree can still occur
- Lips and cheek tighten to hold and stick food in place for chewing practice



## 10 months

- Upper and lower lips will round over feeding utensil to bring food into mouth
- Lip movements to keep mouth closed during chewing and when moving food around the mouth start to develop



## 12 months

Some food and saliva loss during chewing can be seen



## 13 - 14 months

- Able to chew with lips closed
- Corner of lip and cheek helps to hold food in place when needed



## 18 - 24 months

- No food loss from the front of the mouth during chewing and swallowing
- Use of a more mature suck pattern to take in fluid from the cup

## 36 months



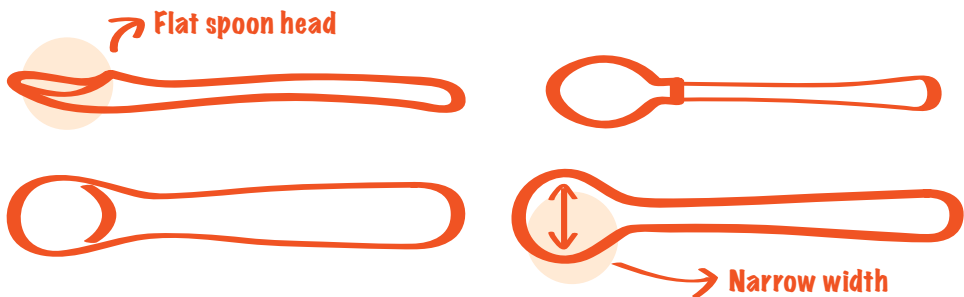


To help with the development of lip movements for feeding, it is important to look at the spoon shape and size. Not all spoons are made equal and the spoon used at each stage of development can help your child develop the right lip placement and movement.

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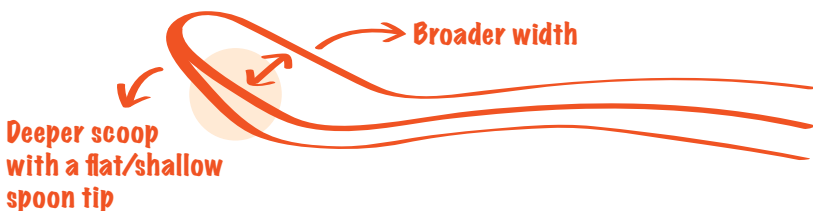
#### 4 - 6 months of age:

- Spoon should be almost flat.
- The spoon width should be narrow enough for the entire spoon to comfortably enter the child's mouth.
- Spoon should enter the mouth from the front and rest on the child's tongue.
- Child's lips should be able to close over the spoon.
- When the feeder removes the spoon, the natural closure of the lips around the spoon will help to strip/clean the puree off the spoon and into the child's mouth.



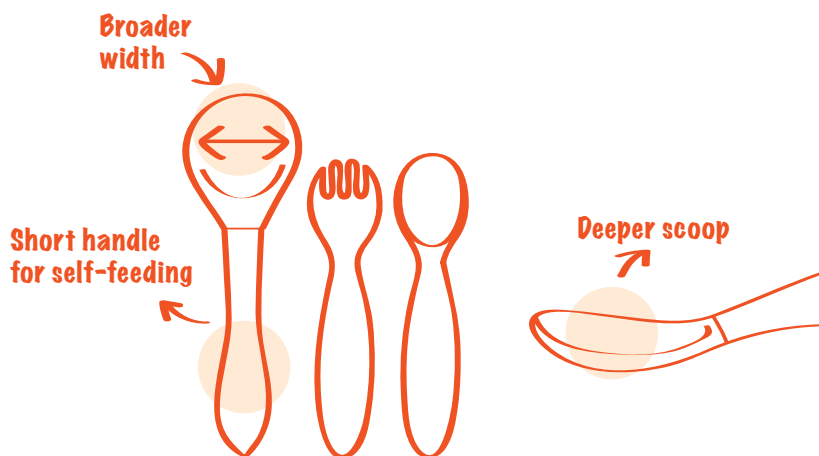
#### 8 - 10 months of age:

- As your child gets better at feeding and is starting to get frustrated with the small amounts on the spoon or is swallowing at a much faster rate than you can keep up, it is time to change the spoon.
- The spoon can have a slightly deeper scoop well and a broader width. It should still allow your child to comfortably remove the food from the spoon using his/her lips.
- If you find that food is left on the spoon after you remove it from your child's mouth, the spoon well is too deep and the spoon should be changed.



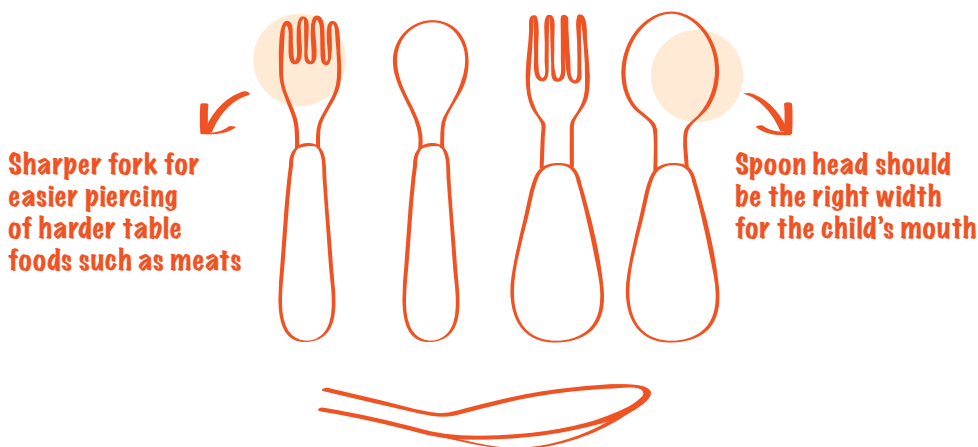
## 12 - 18 months of age

- As your child will now be able to effectively clean the food off the spoon and with his/her growth, developed skills and food variety, the spoon should start looking closer to what an adult might use but smaller so that it can still comfortably fit into your child's mouth.
- Again, if you find that food is left on the spoon after you remove it from your child's mouth, the spoon well is too deep and the spoon should be changed.



## 18 months and beyond

- Your child should be able to effectively clean any food off his/her spoon.
- The spoons should however continue to be of the right size – meaning that it has to be able to fit comfortably into your child's mouth and no food should be left on the spoon after your child removes the spoon from his/her mouth.



# DEVELOPMENT OF TONGUE MOVEMENTS FOR FEEDING

## 4 - 6 months

- Suckling actions used to draw food in from spoon
- Tongue movements cause food to be pushed out of the mouth



## 8 months

- Refining front to back tongue movement with less food loss from the mouth
- Side-to-side tongue movements start to be seen



## 9.5 months

- Tongue may start to stick out and sit under the cup to provide stability for drinking
- Intentional front to back tongue movements to move food to the back of the mouth for swallowing
- Up-and-down tongue movements start developing



## 10 months

- Tongue collects food from the side and into the centre of the mouth during chewing



## 12 months

- Almost no more front and back tongue movement to push food to the back of the mouth for swallowing
- Tongue tip elevates during swallow initiation



## 13 - 14 months

Starting to be able to keep food in the mouth even when lip opens



## 15 months

Tongue tip elevates during the movement of food from the front to the back of the mouth for swallowing



## 18 - 24 months

Improved abilities to move food around the mouth with the tongue



## 36 months

To help with feeding skill development for the tongue, the most important element is not to overfill your child's mouth or give them too big an amount for their mouth. This allows them to comfortably move the food in their mouth – bringing the food from their teeth region to the middle of the tongue for transfer to the back of the mouth when they are ready to swallow.

The spoon recommendations above also incorporate this aspect of feeding development.

Additional things you can introduce to assist your child in developing and strengthening their tongue control are as follows:

### **From 6 - 8 months:**

Increasing the thickness of the puree and introducing different textures by mashing their food instead of blending their food will help your child learn how to move the food in their mouth using their tongue. This is an important skill that your child will need when they start learning to chew more solid food.

### **From 8 - 9 months:**

Allowing your child to mouth big chunks of hard food like teething rusks, apple wedges and thick starfruit slices will allow your child to move his/her tongue around the food. This strengthens their tongue muscle and allows them to learn the different ways they can move their tongue.



Please do this with adult supervision and do not leave your child unattended. If your child bites off a big chunk of the fruit or vegetable, please remove the piece from their mouth immediately if your child is unable to spit it out.

### From 9 - 10 months:

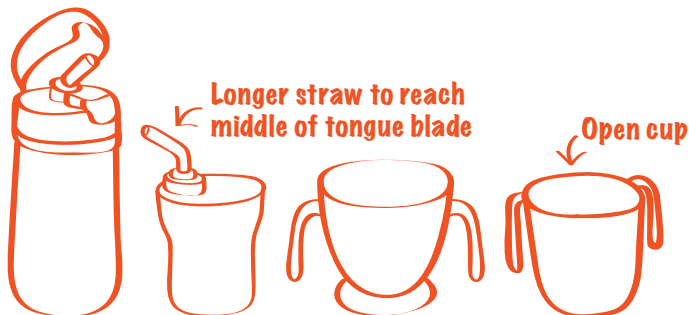
Introducing meltable biscuits such as baby puff biscuits, yoghurt melts and baby wafer biscuits helps your child build the tongue skills required for chewing. When your child bites on these biscuits, the tongue naturally moves to the food. The meltable nature of these foods would dissolve it into a paste. This will allow your child to scoop with his/her tongue and bring the food to the centre of the tongue before pushing it to the back for swallowing. Without this skill, your child will find it more difficult to manage harder to chew foods as there will be more back and forth movement of the food from the teeth to the tongue.

To test if the product is safe for your child, place it above your tongue and cover it with your saliva. If you can mash it on your hard palate using your tongue and no teeth, it is the right type of biscuit to support early chewing skills.



At this age range, it is also important to introduce other forms of drinking beyond breastfeeding and the milk bottle. As tongue placement is different for cup drinking and straw drinking, it is important to introduce your child to both. They might pick up the skill for one faster than the other and it is okay.

It is recommended that traditional cups and straw bottles be used instead of the no-spill ones. The skill required to drink from the no-spill cups is not the same as regular cup drinking. No-spill straw bottles tend to require a stronger suck to elicit the fluid; this can be frustrating for a new learner.



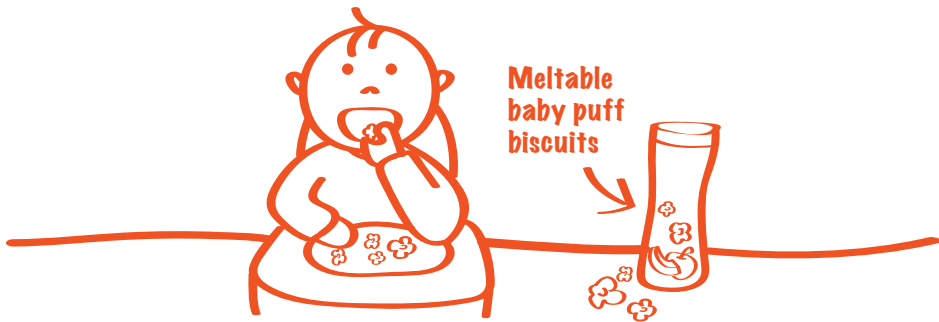
# DEVELOPMENT OF JAW MOVEMENTS FOR FEEDING



Earlier we mentioned the importance of introducing hard and big solids such as apple wedges and teething rusks as well as meltable hard solids such as yoghurt melts and baby puff biscuits for tongue development.

These textures also help with the development of jaw muscles for chewing.

At 8-9 months when your child is mouthing the hard apple wedges or baby rusks, your child is also working on the muscle movements for chewing without actually chewing a food item. Their jaw muscles are developing the strength they need to support up-and-down chewing movements as well as side-to-side chewing movements. These side-to-side movements are important for the grinding motion we use when we chew pieces of meats.



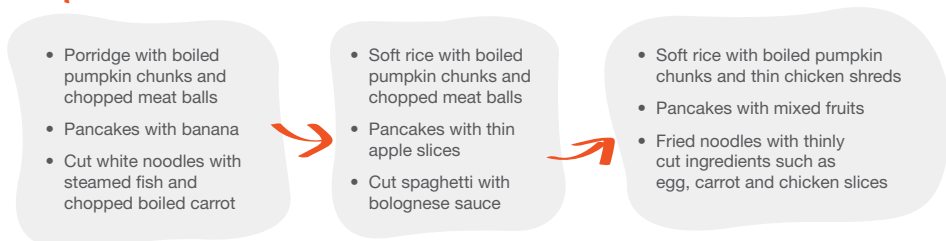
At 9-10 months when you introduce the meltable biscuits, the meltable nature of the biscuit allows your child to practise the movements for chewing without too much added effort. As the biscuits melt into a paste, it makes it easy for your child to combine both the jaw and tongue movements required for chewing.

When you introduce soft and chewable solid food textures, these textures will not melt but they have a low chewing load and when chewed, they easily form a soft and cohesive ball, allowing your child to gradually refine the jaw and tongue movements for chewing.

You will know when your child is ready to move up to the next texture level when your child starts chewing and swallowing the food you have given him/her at a faster and more efficient rate. The different texture levels are described in the developmental food continuum that is found in the few pages after this.

It will be wise to upgrade one food texture at a time instead of everything on your child's plate as your child will need time to develop the skills for the next level up.

### Example:

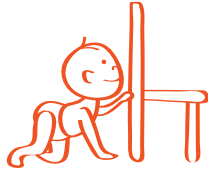


# DEVELOPMENT OF MOTOR SKILLS RELEVANT TO FEEDING



## 4 - 6 months

- Sitting balance emerges; sits with support
- Beginning hand to mouth play
- Increased reaching skills
- Reaches for bottle or spoon when hungry



## 9.5 months

- Trunk rotation and weight shifts
- Beginning to move in out of different positions (E.g. pulling to stand)
- Uses finger to rake food toward self
- Puts finger in mouth to move food and keep it in



## 12 months

- Would feed together with parent/caregiver
- Grasps spoon with whole hand
- Holds and tips bottles
- Holds cups with 2 hands



## 18 - 24 months

- Able to pick up, dip and bring foods to mouth
- Increasing utensil use (not efficient until after 24 months of age)
- Scoops puree with utensil and brings to mouth



## 8 months

- Trunk control sufficient for independent sitting for more than 3 - 5 seconds
- Stable head control in sitting (no head bobbing)
- Transfers toys and food from one hand to the other
- Holds bottles with both hands



## 10 months

- Independent sitting in a variety of positions
- Pincer grasp developing
- Pokes food with index finger
- Uses finger to self-feed appropriate foods

## 13 - 14 months

- Efficient finger feeding
- Practising the use of utensils but may not be able to self-feed for the whole meal



## 36 months

- Use fingers to put food onto spoon (instead of scooping)
- Increasing fork skill
- Open cup drinking without spilling
- One-handed cup holding





# CHANGES IN FOOD TEXTURES ACROSS AGES

Adapted from the *Developmental Food Continuum* by  
Dr Kay Toomey

**4 - 6  
months**

## Thin rice cereal

Plain powdered rice cereal mixed with expressed breast milk or formula milk

**5.5 - 7  
months**



## Thicker rice cereal + thin baby food puree

Plain powdered rice cereal mixed with expressed breast milk, formula milk or water

+

Fruit and vegetable puree or freeze-dried baby food powders can be mixed into the plain rice cereal

After 6 months of age, protein such as tofu, blended beans and lentils and blended fish can be added

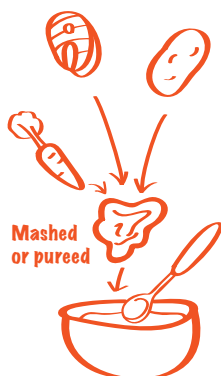
**7 - 9  
months**

## Thicker rice cereal + thick baby puree

Plain powdered rice cereal mixed with expressed breast milk, formula milk or water

+

Fruit and vegetable puree or freeze-dried baby food powders can be mixed into the plain rice cereal



## Mashed table foods & table food puree

### Carbohydrate:

Porridge, mashed soft rice, mashed/blended white noodles, mashed potato

### Vegetable/fruit:

Mashed carrot, mashed broccoli, mashed pumpkin, blended green vegetables, mashed bananas, mashed papaya, boiled and mashed pear

### Protein:

Mashed tofu, steamed egg, mashed fish, blended meats, mashed baked beans and softened lentils

## Hard fruits, vegetables and food that do not break apart

Hard textured food used for exploring only, not consumption:

Teething rusks, carrot sticks, celery sticks, cucumber sticks, apple sticks, bone of chicken drumstick, pork rib bone

**9 - 10 months**



### Meltable solid food

- Keeps its shape and melts in the mouth without having to apply pressure
- Baby biscuits that are suitable for children at 6 months of age, such as baby bites, puff biscuits and yoghurt melts

### Soft and mashable solid food

These have a soft exterior which keeps their shape and can be broken apart using only the tongue or up-and-down jaw movements without using the teeth

**Carbohydrate:**

Chwee kueh (Steamed rice cake), chiffon cake

**Vegetable/fruit:**

Cubed banana, cubed melons, boiled Chinese melons

**Protein:**

Cubed tofu, steamed egg, scrambled egg, flaked steamed fish

**11 months**



### Soft and chewable solid food

Soft foods that need chewing with the teeth to break apart

**Carbohydrate:**

Soft rice, white noodles, fries, lightly toasted white bread, pancakes

**Vegetable/fruit:**

Boiled and cut carrot, cauliflower, Chinese cabbage, ripe pear (thinly sliced), mango, assorted berries, kiwi fruit

**Protein:**

Meatballs, meat patties, steamed fish, cut fish balls/fish cake, chopped dumplings/wantons

**12 months**

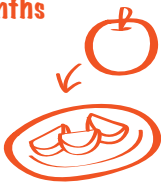


### Mixed food textures

Dishes and food items with more than one texture:

Fried rice, spaghetti bolognaise, fishball noodle soup (cut and mixed), buns with filling, omelette

**13 - 14 months**



### Soft table food served in appropriate shapes and sizes

**Carbohydrate:**

Soft rice, any noodles, fries, bread without hard exteriors, waffles

**Vegetable/fruit:**

Cut vegetable stir-fry, cut melons, assorted berries, sliced apples and sliced pears

**Protein:**

Grilled fish, stewed meats, fried egg, cut dumplings/wantons

**15 - 36 months**



### Regular table foods

Foods with hard exteriors that need grinding and rotary chewing to break apart, including food items that shatter and scatter in the mouth

**Carbohydrate:**

Rice, noodles, potato wedges and all breads

**Vegetable/fruit:**

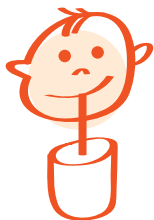
Vegetable stir-fry, cut fruit

**Protein:**

Fried fish, cut meats e.g. char siew (roasted pork), chicken pieces

# ALL MUSCLES

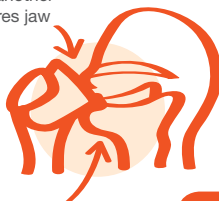
The main muscles for swallowing do not start at the mouth. It starts with the child's core muscles. The child's ability to sit firmly with or without support and hold his/her head up is the first step for feeding. Without a strong foundation, it is hard for the muscles of the mouth to do what they need to do!



Lip muscles also need jaw stability to wrap around the straw; together with firm tongue placement on the hard palate, they create enough negative pressure for sucking from a straw!

Proper lip closure to prevent food and drink from falling out of the mouth. The closing of the mouth is another job that requires jaw stability!

Support base of tongue elevation - this prevents water from leaving the back of the mouth while the airway is still open.



## 90-90-90 seating

- 90 degrees at the hips
- 90 degrees at the knees
- 90 degrees at the ankles



Support tongue tip elevation - this prevents water from coming out of the mouth.

**is needed to**

**helps with**

Jaw muscle stability



**For the muscles of the lips, tongue, mouth and swallowing to work well, good body support is needed!**

Jaw muscle stability to open the mouth, and provide a firm base for the spoon to sit while allowing for the lips to close over the spoon, so that the food moves inwards into the mouth as the spoon is pulled out of the mouth.

**helps with**

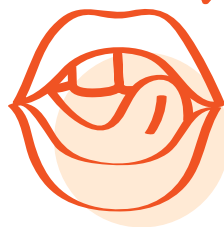
Jaw muscle stability so that the tongue has a firm anchor that will allow it to push the food from the front to the back of the mouth for swallowing.

Jaw muscle stability so that the tongue has a firm anchor that will allow it to push the food from the middle of the mouth to the side for chewing.



Jaw muscle stability to open the mouth and support biting of food. Jaw stability is also needed to help the chewing muscles move up and down, and around for effective chewing.

Tongue muscles also need a stable jaw to move around the mouth, clearing the bits of food that have fallen between your cheek and teeth!



The muscles for feeding change in shape and function for the different feeding utensils we use and the different types of food we eat. Below you will find a general summary of the different muscle movements that happen when we drink and eat.



### Straw drinking:

- Lip muscles wrap around the straw.
  - Cheek muscles tighten to help increase the negative pressure generated for sucking.
  - Tongue provides stability to further anchor the straw in place.
  - The tongue blade raises against the hard palate to generate the negative pressure for sucking.
  - The tongue also stops the flow of fluid to the space below the tongue.
- 



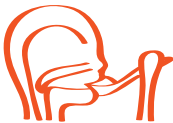
### Cup drinking:

- Lip muscles close to create a tight seal to prevent spillage out of the mouth.
  - The lips also help to direct the fluid into the mouth and onto the tongue.
  - The tongue tip is elevated and sitting just behind the lower lip to receive the fluid.
  - The tongue forms a scoop-like shape to hold the fluid in the mouth and prevent the food and drink from falling into the space below the tongue.
  - The back of the tongue pulls back and upwards to the soft palate to stop food from entering the throat before a swallow reflex is triggered.
- 



### When we swallow:

- Eyes see the food/drink coming and our brain will send signals to close our vocal folds.
  - A tight seal is formed over the airway through a series of muscle movements in the throat to keep food out.
  - The muscles at the back of our throat squeeze in sequence to help move the food down into the food pipe (oesophagus).
- 



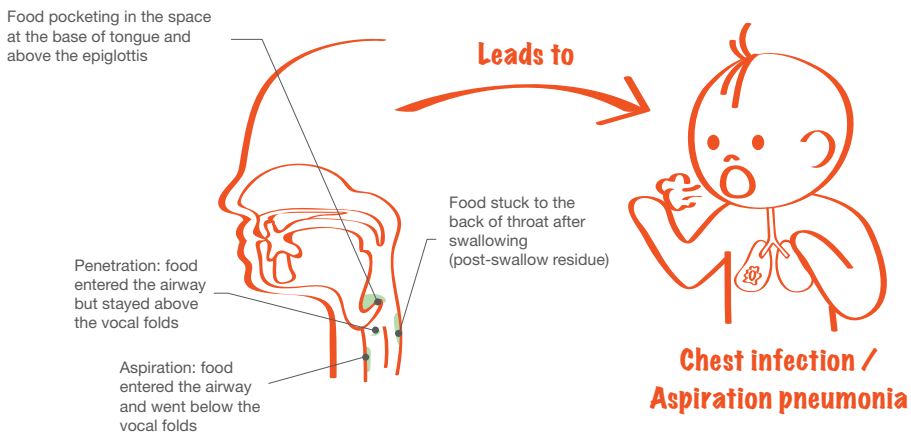
### Eating:

- The front teeth (incisors) cut and tear food into a smaller size when we take a bite!
- The tongue moves the food from the front or middle of the mouth to the side and back teeth (pre-molars and molars) for chewing.
- The grinding action of the teeth breaks the food down into fine pieces.
- Together with tongue movements, saliva is mixed into the food.
- The tongue sweeps across the whole mouth to bring the food scattered across the mouth to the middle of the mouth.
- As the above happens, a sticky paste is formed. This paste is rolled into a ball by the tongue and brought to the middle of the mouth and then the back for swallowing.

Throughout this whole process, the back of the tongue is pulled back and up to prevent the food from falling into the throat before a swallow happens.

The tongue also stops food from falling into the space under the tongue.

The other set of muscles that need to work well are the muscles of the throat! When a swallow happens, lots of small and big muscles have to work together in perfect timing so that the food and drink goes into the food pipe and stomach. If one set of muscles do not move as well as they should or slower than it should, not all the food and drink will enter the food pipe and they may stay on the walls and spaces of the throat. The airway may also have trouble closing completely and some food and drink will enter the lungs instead of the stomach! This is called aspiration. Aspiration can happen any time before, during and after the swallow process. Aspiration is dangerous as over a period of time, it can cause a serious chest infection called aspiration pneumonia.



**To help manage aspiration caused by muscle weakness, reduced muscle movement and uncoordinated swallows, the following may be prescribed by a speech therapist:**

- Change in diet textures (e.g. finely chopped food, blended food)
- Thickened fluids
- Certain body positioning to help compensate for the muscle deficit (i.e compensatory strategies)
- Muscle strengthening exercises
- VitalStim therapy/Swallow therapy with surface electromyography (sEMG) biofeedback

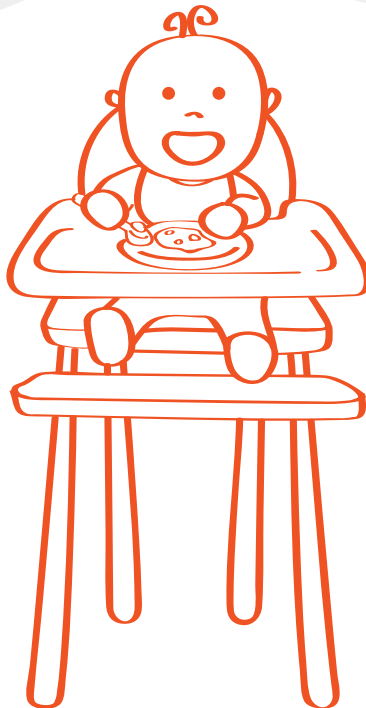
**These are some signs of aspiration. If your child exhibits any of the following signs, please inform your doctor or speech therapist:**

- Coughing during and after eating or drinking
- Constantly needing to clear the throat during or after eating or drinking
- Having a wet-sounding voice during or after eating or drinking
- Difficulty breathing during or after meals
- Difficulty swallowing
- Unexplained fevers

# ALL ORGANS

**All organs must be functioning well to ensure safe swallowing and a pleasurable feeding experience.**

**There are many medical conditions that can result in feeding difficulties. The information below is a general overview. If you would like to know more about how your child's diagnosis impacts his/her feeding development and safety, please kindly speak to your child's doctor and speech therapist for more information.**



## Sensory processing disorders

affect the ability to interpret sensations in the mouth correctly during feeding. This is important in ensuring that the correct mouth movements are executed. An over-reaction to the food may result in food refusal behaviours and an under-reaction to the food may result in food residues in the oral cavity as well as the need for strong food flavours and textures.

Delayed development and neurodevelopmental conditions such as autism and ADHD change the child's sensitivity to sensory inputs and may affect the child's understanding and learning of food and their overall mealtime experiences.

## Structural conditions

of the head and neck will not only affect the child's mouth development for feeding, it may also disrupt the natural swallow-breathe rhythm. This increases the child's risk of having food and drink enter the lungs instead of the stomach.

## Respiratory conditions

have a direct impact on swallow safety. The swallow-breathe coordination during swallowing is important as it makes sure that food and drink do not enter the lungs before, during and after a swallow. Respiratory conditions can also cause the child to become tired easily during mealtimes which may result in less food eaten and reduced lung protection.

## Genetic conditions

can cause overall developmental delay, including feeding and swallowing skills. Most genetic conditions also cause complications of the other organs and this can further complicate the development of feeding skills.

## Metabolic disorders

affect the way nutrition is digested, absorbed and stored in the body. Children with these conditions may require strict food restrictions which may result in a limited variety of foods and/or specialised formulas. As most of these specialised formulas do not taste nice, tube feeding may be used to ensure that the child receives his/her required nutrition. These metabolic conditions may also present with reduced appetite.

## Cardiac conditions

reduce the child's mealtime stamina and may also disrupt the breathing and swallowing coordination that is important to ensure a safe swallow. Medical conditions of the heart may interfere with oxygen levels which will affect the child's stamina to finish a meal. Additionally, numerous feeding, growth and nutritional challenges may arise following surgical cardiac procedures that may require the child to be placed on non-oral feeding (i.e. tube feeding) for the duration of the recovery or until the child is able to eat enough food to receive adequate amounts of nutrition for growth and healing.

## Neurologic causes

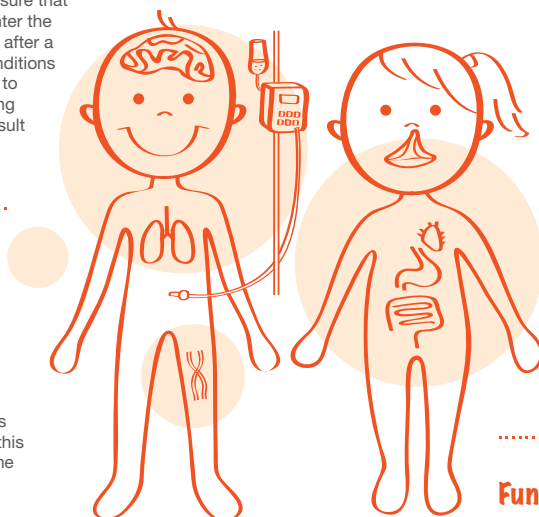
affect the child's ability to feed as the brain is the main control centre for the 5 major nerves and 50 over muscles for swallowing. When the nerve signals cannot be sent or the signal is reduced, feeding problems will occur.

## Craniofacial syndromes

are often associated with malformations of the face and skull. These malformations affect the development of typical oro-motor movements for feeding. High or low muscle tone of the facial muscles will also affect feeding efficiency, swallow safety and the child's ability to complete the meal without becoming too tired.

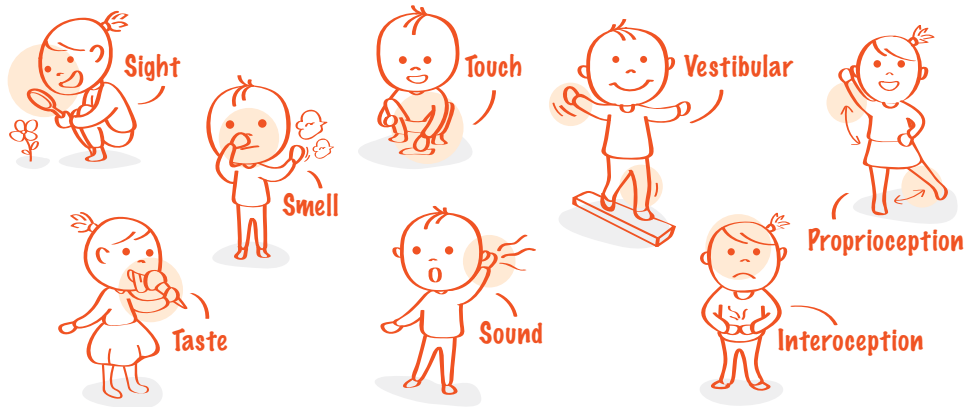
## Functional disorders

of the oesophagus disrupt swallowing as the oesophagus is the food pipe that channels food coming from the mouth into the stomach. These disorders can slow down the time taken for the food to go through the oesophagus as well as cause discomfort during and after a swallow. These negative sensations may result in feeding refusal behaviours.



# THE 8 SENSES

Understanding how our 8 senses are involved during mealtimes can help you identify why your child prefers certain foods over others. Knowing the food characteristics your child prefers can also help you think of ways you can incorporate new foods into their diet gently.



## Sight



The appearance of some foods can look overwhelming for a child with sensory processing difficulties as their brain tries to process the different colours at the same time.

For children who are visually sensitive, they might find it more appealing if the vegetable and protein element is 'hidden' in a sandwich. For children who enjoy colours, they may be more receptive to try new foods if served on a pizza with a combination of colourful ingredients or a mixed fruit and vegetable salad.

### A child who is visually-sensitive may

- Avoid eye contact
- Attempt to scatter food off the table
- Look away from food and close eyes
- Move chair back from the table
- Exhibit repeated eye blinking and eye watering
- Squint
- Vomit

### What you can do

- Put only one food item down on the plate or spoon and replenish only after your child has finished the first piece.
- Allow your child to plate their own meal if they are able to handle a pair of food tongs or a serving spoon.



## Smell



Just as some food smells are offensive for some adults, it is the same for children.

### A child who is sensitive to food smells may

- Cover his/her nose with the hand/shirt
- Have watery eyes
- Turn his/her head away
- Make a funny face
- Cough/gag to smells

### What you can do

For these children, the mealtime environment may be more enjoyable if it is free from cooking smells and strong smelling foods. You can gradually help them desensitise by trying some of the activities listed in the 'Learning' section of this book.

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## Sound



Foods can produce sound when we chew. Some of these foods produce loud crunching sounds like potato chips and cookies. Others may have a loud crunch with the first bite but melt/reduce to a paste in the mouth and you will no longer hear any sounds after the first bite. And there are some foods with no sound at all when being chewed. Some children may be sensitive and for them, these crunching and munching sounds can be very loud.

### Children sensitive to sound may

- Repeatedly blink their eyes
- Startle to noises
- Cover his/her ears during meals

### What you can do

- Have only one food item on the plate that makes a sound when you chew.
- Stick to foods without the crunching sounds until your child is able chew pieces of chicken and chunks of grilled/steamed vegetables effectively. His/her efficient chewing skills will help him better understand how long the chewing process would go on for before the food sound disappears.

## Touch



Foods come in different textures and sensations. Some foods are cold, some are hot, some are soft and some are hard. Some dishes contain foods with a variety of different textures. These include salads, pasta dishes with a few different ingredients, quiche, fried rice, some pizzas and stir fried noodles with a variety of ingredients. For a child who is sensitive to touch, these foods might be challenging for them as the texture changes with every bite and chew in the mouth, in addition to the change of taste.

### Children who have tactile sensitivity may be observed to

- Grimace
- Frequently wipe their hands
- Hold their hand up with palms open (finger splay)

For these children, new foods with lots of different textures may be less overwhelming when served deconstructed (see examples on the next page).

## Taste



**Taste milestones experienced by children are as follows:**

<b>Newborn</b>	<ul style="list-style-type: none"> <li>• Has &gt; 2500 taste buds dispersed throughout the soft palate, epiglottis, pharynx, larynx</li> <li>• Can discriminate between different concentrations of sweet flavours</li> </ul>
<b>2 weeks old</b>	Rejects bitter taste
<b>2 months old</b>	Rejects sour taste
<b>3 months old</b>	Can detect flavour differences
<b>4 months old</b>	Preference for salt emerges
<b>1-3 years</b>	Number of taste buds remains constant
<b>8 years</b>	Same number of taste buds as adults but higher density due to smaller tongue size

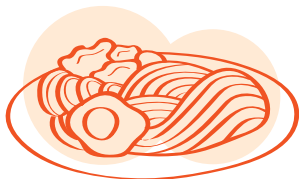
It is important to note that children experience taste at a much higher intensity than adults. Foods that may not be spicy for an adult can be very spicy for a child.

**A child who is over-responsive to taste may**

- Gag
- Vomit when tasting food
- Grimace
- Shudder

A child who is over-responsive to texture would show an immediate reaction, while a child with taste over-responsiveness would have a delayed reaction as there is a chemical processing that takes place in the brain.

These are some of the reasons why some children enjoy chicken nuggets, French fries and crackers over other foods.



**Tastes different with every bite**



**Tastes the same every bite**

**What you can do for children with touch and taste over-sensitivities**

We can help our children overcome their sensory sensitivities by changing/deconstructing their food during plating.

Adults' meal	Kids' meal
	
No control over which ingredients land in the spoon	Control given to pick and choose which ingredient they would like to explore/taste
Taste different with every bite	Single ingredients taste the same with every bite
	Opportunity given to try sauce when child feels ready

## Proprioception



Proprioception is the body's ability to sense its location, movements and actions. It enables us to do things like touch our nose with our eyes closed. In feeding, proprioception is the sense that allows our tongue to know where it is in the mouth. This allows it to bring food to the back of the mouth for swallowing and collect food that have fallen into the area between our cheek and teeth. Without proprioception, our tongue will have difficulty bringing food to the teeth for chewing and preparing the food for swallowing. We might not chew food well enough and we may find food all over the mouth after we swallow.

## Vestibular



The vestibular system helps keep us upright and balanced. When you stand on one leg with your eyes closed, it is your vestibular system that triggers the shifts in your body to help keep your balance. Without a good vestibular system, it is hard to concentrate on the movements of the mouth during meals as the body is working extra hard to maintain its balance and not fall over. The tongue may also have difficulty knowing where to move or how to move as it does not know how the head is positioned. It is like not knowing which direction you are facing while looking at the road map - you would not know in which direction you should start walking!

## Interoception

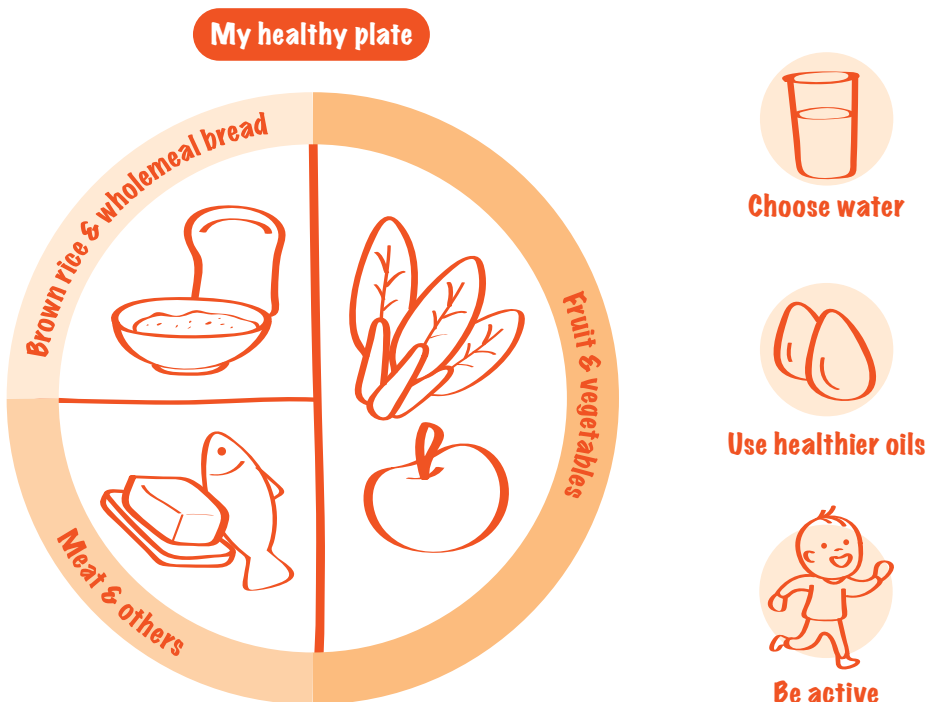


Interoception is the sense that tells us what is going on in our bodies. It is the urge you get that tells you to go to the toilet and when you are feeling hungry or full. When this sensory system is under or overworking, we do not get an accurate message of what our body needs and it can lead to under or overeating.

If you think your child may have difficulties in these areas, please talk to your paediatrician or Occupational Therapist.

# NUTRITION

It is important that every child eats a variety of food from the various food groups to get the essential macro and micro nutrients that they need. At each meal, they should eat something from each food group on the healthy plate.

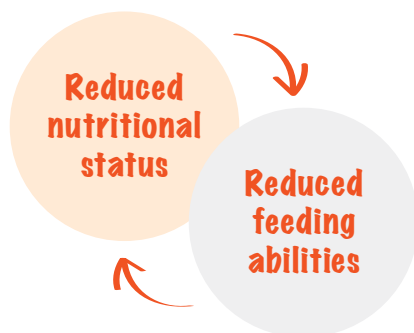


Source: <https://www.healthhub.sg/live-healthy/578/A%20Healthy%20Food%20Foundation%20-%20for%20Kids%20and%20Teens>

Adequate nutrition is required for growth to take place. It also provides the child with sufficient energy to support his/her learning, develop oro-motor skills and improve feeding efficiency.

Nutrition and feeding skills work together. If nutrition is too little, the child will not be able to develop the muscle strength and feeding skills to ensure adequate nutrition intake that the child needs. This then becomes a continuous cycle resulting in reduced growth both physically and developmentally.

It is also important to have a realistic idea on how much your child should be consuming. You may find this guide from [www.healthhub.sg](http://www.healthhub.sg) useful in helping you assess if your child is eating adequately.



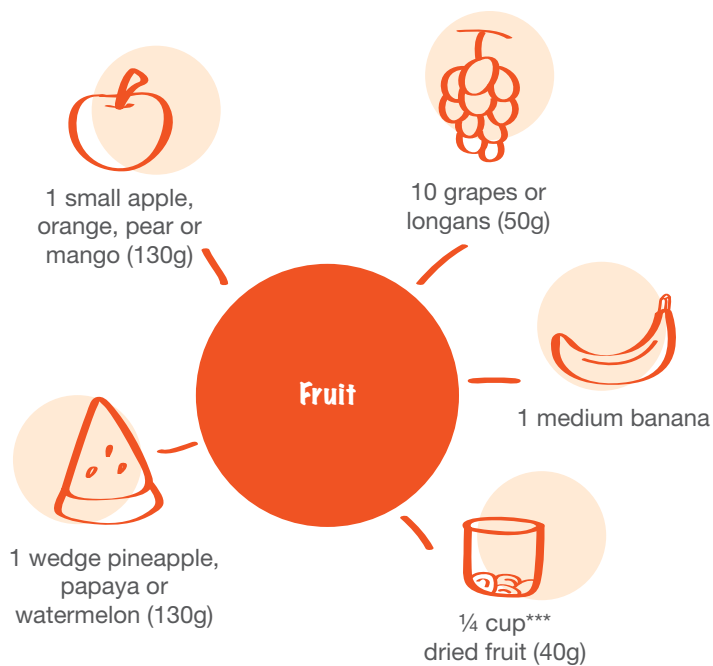
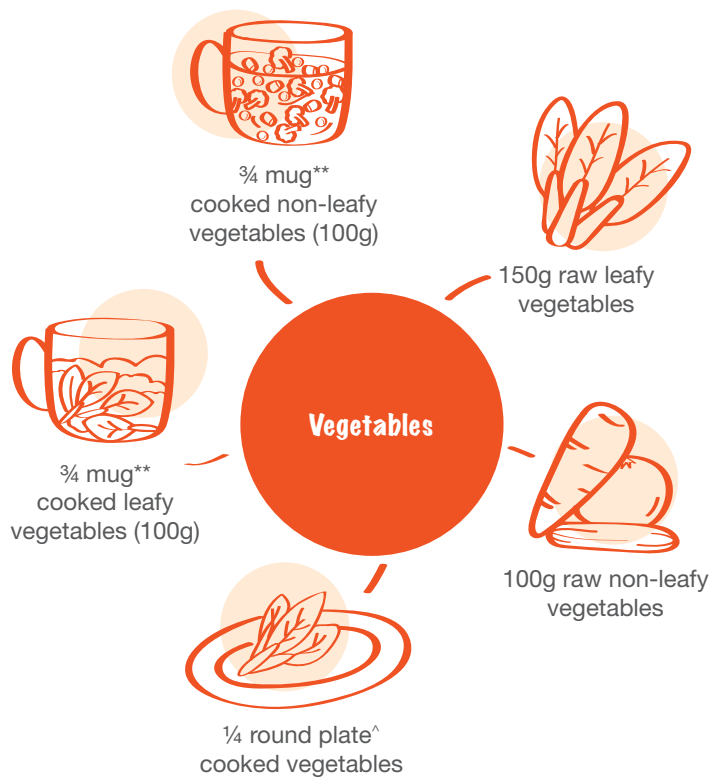
Food Groups	Recommended number of servings per day				
	6 - 12 months	1 - 2 years	3 - 6 years	7 - 12 years	13 - 18 years
Brown Rice and Wholemeal Bread	1 - 2	2 - 3	3 - 4	5 - 6	6 - 7
Fruit	½	½ - 1	1	2	2
Vegetables	½	½	1	2	2
Meat and Others	2	2	2	3	3
Of which are dairy foods or calcium-containing foods	1½	1½	1	1	1

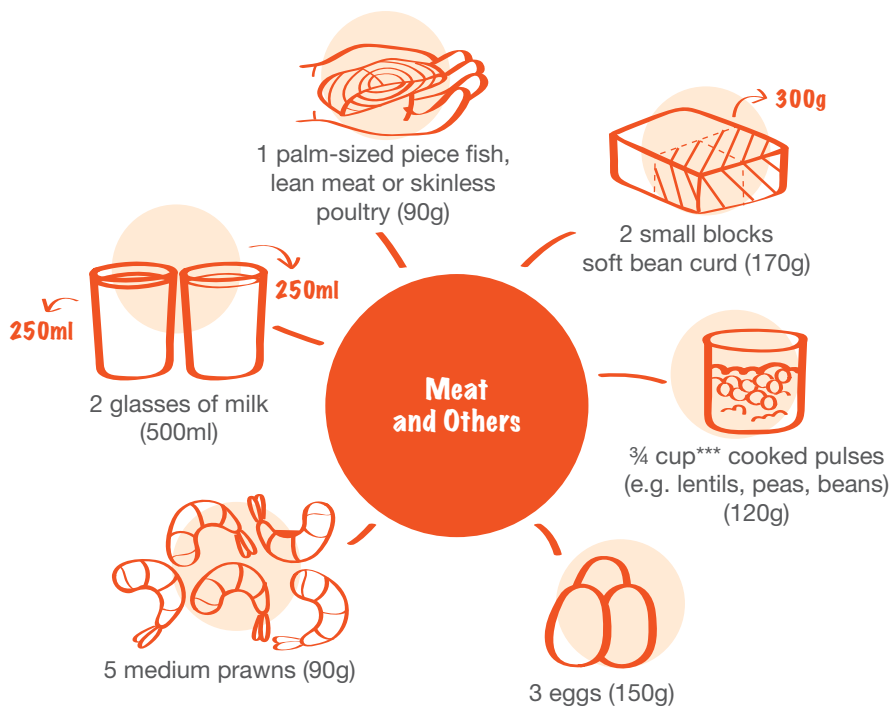
Source: <https://www.healthhub.sg/live-healthy/578/A/%20Healthy%20Food%20Foundation%20-%20for%20Kids%20and%20Teens>

### Examples of 1 serving

\* rice bowl | \*\* 250ml mug | \*\*\* 250ml cup | ^10-inch plate





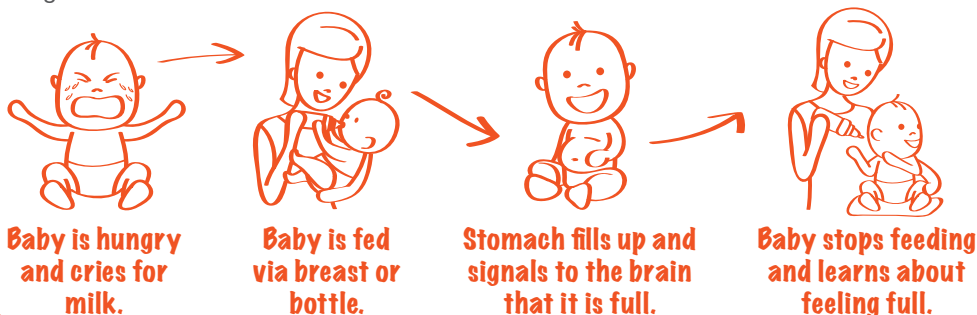


Source: <https://www.healthhub.sg/live-healthy/2040/nutrition-for-preschoolers-61-72-months>

## LEARNING – FEEDING IS A LEARNED BEHAVIOUR

Feeding is instinctive only in the first month of life. As the instinctive reflexes such as the rooting reflex and sucking reflex fade, feeding becomes a voluntary act. This means that babies and children decide if they want to eat or not.

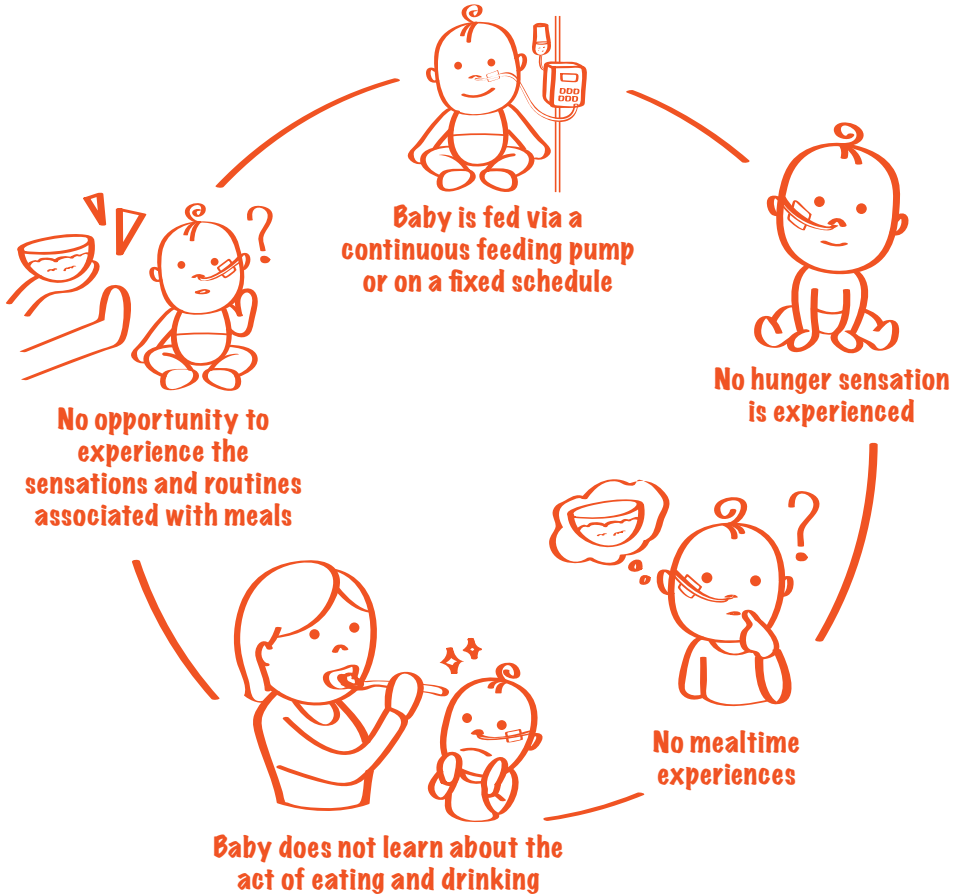
As a newborn, while the reflexes are still present, the baby is learning to respond to his/her hunger cues.





The understanding of feeling full and hungry becomes more familiar to the baby with each feeding cycle. This is the start of the baby learning that he/she has to feed to stop the unpleasant feeling of hunger and that feeding helps him/her feel better (sensation of feeding full).

Sometimes, children with various medical conditions may require the help of the feeding tube to help them meet their nutritional intake. This will have an impact on the child's understanding of hunger and meal times as well as his/her mealtime associations.



It is therefore important to work with professionals such as the medical team, speech therapists, occupational therapists, psychologists and dietitians to commence early intervention that will enable the child to have some alternate mealtimes associations and routines that will help the child transition to oral feeding when the child is medically fit to start oral feeding.

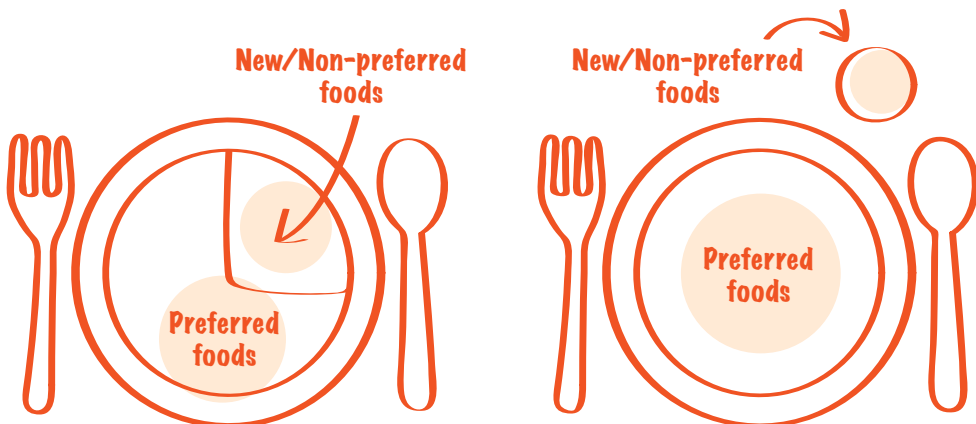
Mealtimes for children who eat by mouth are important too, as they help the child learn about their body's needs, mealtime routines, the different sensations that can be present in the meal, as well as new foods and social expectations during mealtimes.

As eating and drinking is a learning process, it is important to remember that negative mealtime experiences can teach a child to **not** eat. Below you'll find a list of alternative phrases you can say to your child to keep mealtimes pressure-free and enjoyable for all.

Avoid	Try instead
"Take a bite."	"My potato wedges are crunchy, just like the French fries."
"You have to finish everything on your plate."	"I'm going to try the red foods first, what about you?"
"You have to eat your fruits and vegetables first, then you can have dessert."	"I wonder which food is sweet."
"You will make me so happy if you try a new food."	"I enjoyed playing in the toy kitchen with you. What was your favourite part of the day?"
"Apples are good for you."	"Red foods give you a strong heart."

Children with learning difficulties, physical limitations and sensory difficulties may also face negative experiences when learning to accept new food varieties and textures. We can support them to try new foods in these simple ways:

### 1. Separating the new food from the preferred foods:



## 2. Being mindful of the choice of words used when encouraging your child to try a new food:

Instead of saying...	Try saying...
"It's yummy."	"It's crunchy/soft." "It's sweet/sour/spicy." "It feels hard/soft/dry/wet." "It's hot/cold." "These are orange circles."
"Please take a bite."	"I can hold ____ with my teeth!" "It makes a crunch sound." "This is a quiet food." "I can taste different things as I move it around my mouth." "It changes in feeling but the taste is the same."
"You have to eat this as it is good for you."	"Let's have some of these. Let's see how colourful they are!" "Let's hear what sounds they make!" "Let's touch and feel – it feels ____." "Let's have a lick and see what it tastes like!"
"Finish your dinner and then you can have dessert."	"If you say you are full, it means your tummy has no more space for dessert, so let's keep it for later when your tummy is not so full."

It is also important to note that there are about **32 steps** a child will 'walk through' before they will eventually put the food item into their mouth. And it can take up to **10-20 repetitions** of the same food before they might be willing to put it in their mouth.

These 32 steps can be broadly categorised into 5 categories and you will find a list of suggested activities you can try with your child to help increase their familiarity with the new food item.

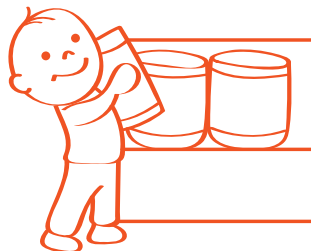
## Tolerates

1. Being in the same room
2. Being at the table with food on the other side of the table
3. Being at the table with food half way across the table
4. Being at the table with food just outside the child's space
5. Looking at food directly within the child's space



## Suggested activities

- Involving your child with grocery shopping by allowing them to list some items they would like to get.
- Involving your child at the supermarket by inviting them to pick out the groceries from the shelves.



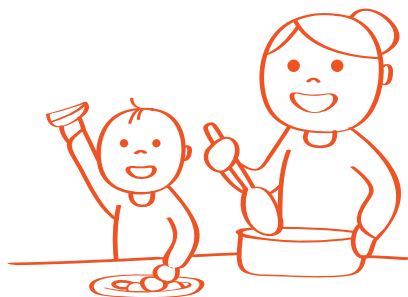
## Interacts by

6. Assisting with preparation and setting up of food
7. Using a container or utensils to stir or pour food/drinks for others
8. Using a container or utensils to stir or pour food/drinks outside of own space
9. Using a container or utensils to stir or pour food/drinks onto own plate to serve self



## Suggested activities

- Involving your child with meal preparation.
- Encouraging them to participate in the cooking process when appropriate.
- Inviting them to serve others.
- Allowing them to fill their own plate and pour their own drink.



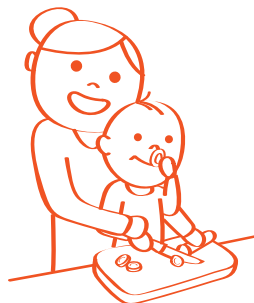
## Smells

10. Odour in room
11. Odour at table
12. Odour in child's forward space
13. Leans down or picks up to smell



## Suggested activities

- Involving your child with meal preparation involving stronger smelling foods.
- Encouraging them to participate in the cooking process of new foods when appropriate.
- Encourage food exploration during food preparation.



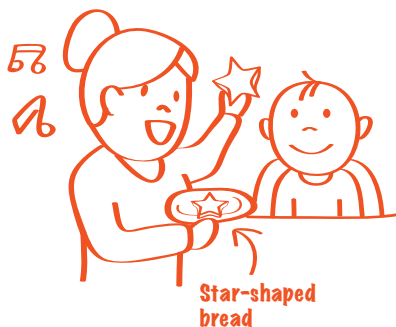
## Touches with

- |                             |                                 |
|-----------------------------|---------------------------------|
| 14. One finger tip          | 20. Chin, cheek                 |
| 15. Finger tips/finger pads | 21. Nose and its region         |
| 16. Whole hand              | 22. Lips                        |
| 17. Arm, shoulder           | 23. Teeth                       |
| 18. Chest, neck             | 24. Tip of tongue/top of tongue |
| 19. Top of head             |                                 |



## Suggested activities

- Encourage your child to explore the new food starting with one fingertip and working up the list above.
- You can pretend the new food is Jack and Jill and recite the nursery rhyme while 'walking' the food up the arm towards the face.
- Create pictures using food – with no pressure to eat. Child can make the picture and serve it to a supportive adult.



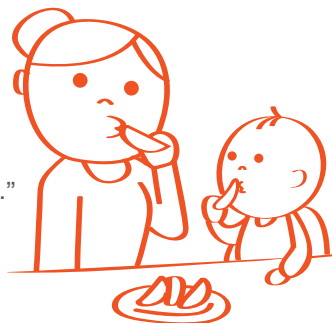
### Tastes by

25. Licking lips or teeth
26. Giving a full tongue lick
27. Biting off pieces and spitting out immediately
28. Biting off pieces, holding in mouth for x seconds and spitting out
29. Biting, chewing x times and spitting out
30. Chewing, swallowing some and spitting some
31. Chewing, swallowing whole piece with drink
32. Chewing and swallowing whole piece independently (eating)



### Suggested activities

- Encourage your child to kiss the food.
- You can say :
  - “I can hold \_\_\_\_ with my teeth!”
  - “It makes a crunch sound.”
  - “This is a quiet food.”
  - “I can taste different things as I move it around my mouth.”
  - “It changes in feeling but the taste is the same.”
- If a food picture was made, you can say
  - “I’m going to try the bear’s ear!”
  - “I wonder how the eyes taste like!”



Your role as the parent/caregiver is to provide a positive and safe environment for your child to learn and explore the new food. Allow your child to take the lead. It is okay to not like a new food at the first instance. Remember it can take up to **10-20 repetitions** of the same food before they might be willing to put it in their mouth.

*The above information has been adapted from Dr Kay Toomey's Steps to Eating Hierarchy.*

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## ENVIRONMENT

The environment the child eats in can support the development of the child's feeding skills and the associations they have with mealtimes.

To encourage them to try new foods beyond their usual favourites as well as to continually develop and refine their feeding skills, it is important to set the mealtime up for success.

**1. Prepare their bodies for mealtimes by having consistent routines which can help to send feeding cues to your child. This may include:**



A 5-minute count-down for them to wrap up their play/activity



Hand-washing before meals



Helping to set up the dinner table



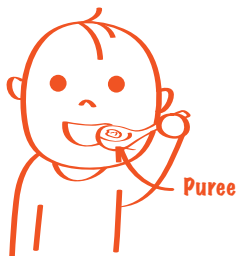
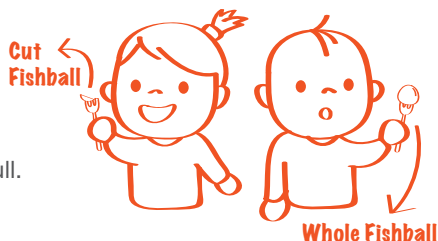
Singing a mealtime song



Inviting your child to help you with the food preparation

**2. Ensure that the foods served are of the appropriate texture and size for their feeding development.**

Giving foods that are too big or too difficult for their feeding skills can make mealtimes challenging for your child to complete. It may also tire them out before they are able to feel full.



Giving foods that are too easy for them would not enable them to further develop and refine their feeding skills.

### 3. Ensure that your child is using appropriately sized feeding equipment. This is critical in supporting your child's feeding skill development.

If the spoon size is too small, your child might get frustrated by the inefficiency as it would take longer to reach a 'full' state.



If the spoon size is too big, your child will have too much food in his/her mouth and it would lead to less space for teeth and tongue to manipulate the food. It would also increase your child's risk of choking.

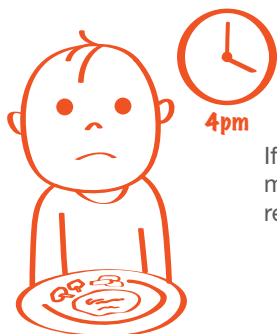
Too long a handle on the feeding utensil will also make it harder for your child to self-feed effectively and efficiently.



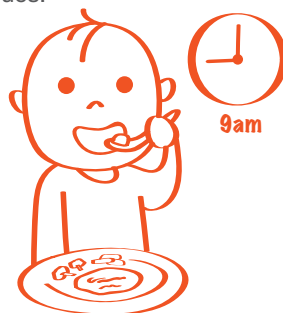
### 4. Appropriate mealtime schedules

Having an appropriate mealtime schedule helps to guide the child when it comes to listening to their body's hunger and satiety (feeling full) cues.

When meals are appropriately spaced out, it is more likely the child will feel hunger cues around the time of the next meal.



If snacks and meals are given at too close an interval, the child may not be hungry when the meal is served. This will lead to reduced appetite and reduced nutrition intake.





## 5. Posture

Postural stability is important because:

It allows the motor part of the brain to focus on the mouth movements needed for feeding instead of having to work on both balancing and eating.



With foot rest



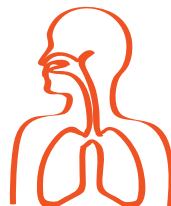
Without foot rest



It allows for better hand-to-mouth coordination and fine motor/tactile manipulation of food.



It supports the body's breathing system. A good breathing system would lead to better swallow-breathe coordination during feeding.



It enables a range of jaw movements for chewing.

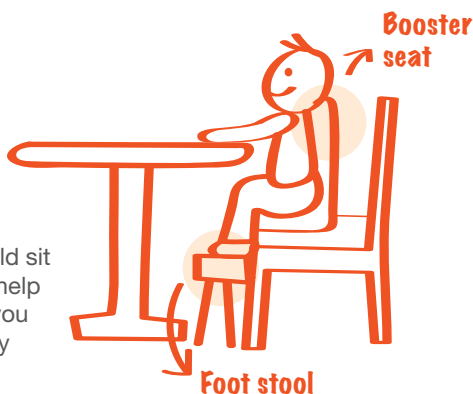
**To achieve good feeding posture there should be 90-90-90:**

**90-degree hips**

**90-degree knees**

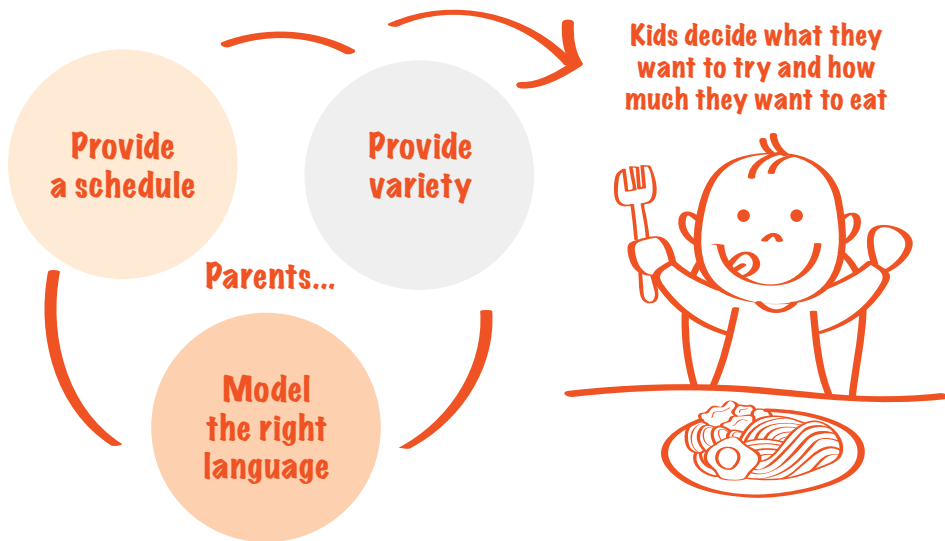
**90-degree ankles**

To achieve this, you may have your child sit on a booster chair with a foot stool to help keep his/her ankles at 90 degrees, or you may seat your child on an appropriately sized chair and table.

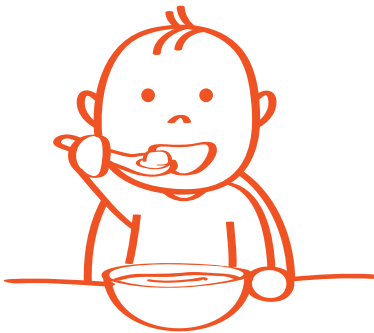


For children and individuals with physical limitations and/or require seating aids such as specialised wheelchairs, please kindly speak to your physiotherapist and speech therapist for the recommended feeding posture.

Lastly, our role as parents is to set the mealtime environment for success and allow our child to lead on what they would like to eat and how much.

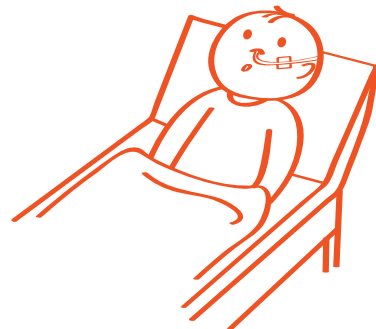


## THE IMPORTANCE OF ORAL HYGIENE



Having healthy teeth enables us to enjoy our meals and chew a variety of food without pain or discomfort. Healthy teeth with no pain or discomfort also help with the development of feeding skills, as children are more likely to eat when it is comfortable to use their teeth. We only have one set of permanent teeth to last us a lifetime. Thus, it is important to keep those teeth healthy and working well for us for a long time to come.

Maintaining good oral hygiene is equally important for children who feed non-orally, as a clean mouth reduces the likelihood of harmful bacteria entering the lungs when saliva accidentally goes down the airway. Therefore, the risk of chest infection is lowered.





Good oral hygiene starts from infancy. Babies are born with their full set of primary teeth (baby teeth) under the gums. Taking good care of those gums by cleaning with a washcloth after each feed will remove the bacteria that cause tooth decay, ensuring a healthy environment when the primary teeth erupt.

Once the first tooth erupts, begin toothbrushing with a fluoride-based toothpaste to keep harmful bacteria at bay.



If primary teeth show signs of decay, it is important to see a dentist right away. This protects the future permanent teeth from being exposed to bacteria which tend to stay in the mouth when tooth decays are not treated.

Flossing is also recommended as soon as two teeth touch each other. Guiding your child to brush with a fluoride-based toothpaste at least twice a day and flossing at least once a day will set your child up for good dental habits in the years to come.



It is recommended to see a dentist every 6 months to maintain good dental health. If you are facing difficulties with toothbrushing for your child, speak to your child's paediatrician, dentist, or occupational therapist for help.

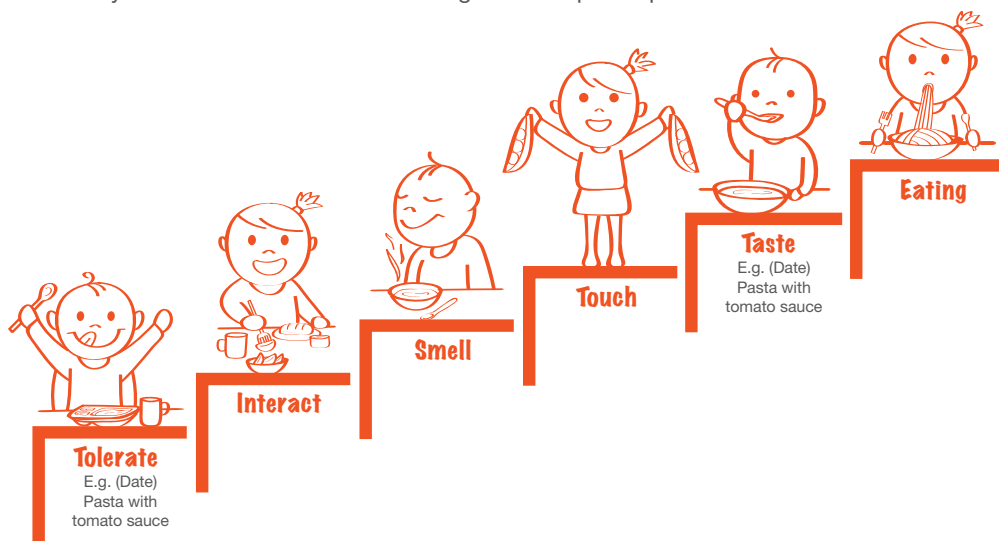
# ADDITIONAL TOOLS TO HELP YOU TRACK YOUR CHILD'S FEEDING PROGRESS

1. Earlier in the book we talked about the 32 steps a child will 'walk through' before they will eventually put the food into their mouth. It will also take up to 10-20 repetitions of the same food before they might be willing to put it in their mouth. You can use the chart below to mark where your child started when you first introduced the food and mark the highest step you saw your child interacting with the food. This can help you track the little progresses your child is making along the way. Do remember that it is the highest level of interaction to record and not the last interaction with the food item.

## Example:

Lucy starts with tolerating the food served on the dining table. She scoops some onto her plate and she touches it with the fork and licks the fork with the tip of her tongue. After a small taste, she quickly pushes the food off her plate and insists on a new fork.

The first interaction was at 'tolerates' and the highest interaction was at 'taste'. This is how you can mark it on the chart using the example of 'pasta with tomato sauce'.



*This diagram has been adapted from Dr Kay Toomey's Steps to Eating Hierarchy.*

2. To help you track your child’s food variety and nutrition adequacy, you can use the food log below to chart the time, amount and food types that have been consumed throughout the day. You can then use the serving sizes found in the ‘Nutrition’ section of the book to help you complete the analysis found on the side of the food log. Alternatively, you can also take the food log to your paediatrician or dietitian to help you with the analysis.

E.g.

Meal	Time/ Duration to complete the meal	Food and liquids consumed			Analysis				
		Quantity	Food Item	Fed by/Utensils	Carbohydrate	Protein	Vegetable	Fruit	Others
Breakfast	7am 20 mins	1 slice	Bread with kaya and butter	Cut into small pieces and self-fed by hand	1 slice				1 tbsp kaya 1 tsp butter
		1 slice	Cheese	Fed by helper		1 slice			
		200ml	Milk (4 scoops + 180ml powder)	Milk bottle (XX brand)		200ml			
Snack	10am 20 mins	5	Zoo animal biscuits	Finger feeds independently	5 pieces				
		120ml	Milk (3 scoops + 120ml powder)	Cup		120ml			
Lunch	1pm 30 mins	1 bowl	Porridge with fish and pumpkin	Self-feed: XX brand feeding spoon	1 bowl	0.5 palm size	0.5 cup		
		1 cup	Water	Straw water bottle (X brand)					
Snack	3pm 15 mins	6 slices	Apple	Self-feed: using fork				6 slices	
		0.5 cup	Water	Cup (cut-out cup)					
Dinner	7pm 40 mins	1 bowl	Rice with fried chicken and vegetable stir fry	Fed by helper: XX brand feeding spoon	1 bowl	1 drumstick	0.5 cup		
		1 bowl	Soup						
Snack	8.30pm 5 mins	200ml	Milk (4 scoops + 180ml powder)	Milk bottle (XX brand)		200ml			

Meal	Time/ Duration to complete the meal	Food and liquids consumed			Analysis				
		Quantity	Food item	Fed by/Utensils	Carbohydrate	Protein	Vegetable	Fruit	Others
Breakfast									
Snack									
Lunch									
Snack									
Dinner									
Snack									

# SUMMARY

We hope that this book has helped you better understand the multi-faceted aspects of feeding and swallowing and that it has empowered you to create positive mealtime experiences with your child.

## References

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**We would like to thank the CPAS Board and Management for supporting us with the development of this booklet. We also extend our thanks to former team members of the Feeding and Swallowing Clinic (FSC) who have paved the way and started the process of creating this booklet, as well as the present team members who carried this through to its fruition. Without the contribution of each and everyone who have been part of this publication, this would not have been made possible.**

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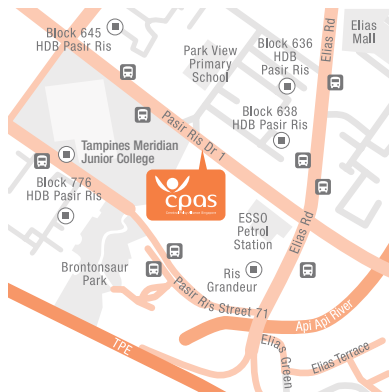
Pasir Ris MRT (EW1)

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### By Bus

358 from Pasir Ris Bus Interchange (West Loop Bus). Alight at bus stop B77249 along Pasir Ris Drive 1, which is opposite our Centre.

39, 53, 81, 89, 109, 518, 518A (from Pasir Ris Drive 1, in the direction of Elias Road). Alight at bus stop B77241 (after ESSO Petrol Station). One minute's walk from bus stop to Centre.



## OPERATING HOURS

Monday to Friday  
(8am - 5pm)

## CONTACT US

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