

# FOOD PROGRESSIONS FOR BITING AND CHEWING

Learning to bite and chew foods efficiently is influenced by the sensory properties of the food and its placement in the mouth. As with any new skill, progress is determined by the specific challenges presented by the food and the degree of success achieved by the learner. The challenge for the parent or therapist is to select foods that offer a "just right" challenge and a high degree of success for the child who is developing these skills. When the challenge is too great, the child will revert to familiar movement patterns that may be inappropriate for handling the food, or be at risk of gagging, choking, or aspirating unchewed pieces. Fear and low levels of success will convince the child that learning to chew is dangerous or not worth the effort involved. Limits in food choices and textures result, creating overall limits in the child's ability to function freely in society.

Biting and chewing food is a multisensory task that requires a high level of coordination of all parts of the mouth. The degree of skill is determined by sensory awareness and discrimination and integrated coordination of the jaw, lips, cheeks, and tongue. Different foods offer different challenges and require different sensorimotor strategies. The goal in therapy is for the child to be able to perceive and interpret the sensory information from the food and activate the appropriate oral movements to transform the solid piece of food into a masticated bolus that can be efficiently swallowed. The child must be able to fine tune sensory awareness and select the most efficient movements for each specific food. This requires a high level of oral sensorimotor skill and processing and opportunities to explore many different foods in an order or progression that assures success in learning.

Selecting food can be a challenging task for the parent or therapist because each food has multiple sensory features. Although there is a general progression or rationale for the food being easier or more difficult, the specific challenges offered by the food interact with the specific skills, limitations, and needs of the individual child. Each food has at least 8 sensory features that simultaneously determine the degree of ease or difficulty for biting and chewing. These include resistance, sensory input, size, shape, texture scatter, consistency, placement, and need for transfer during chewing. The combination of these features determine the overall sensorimotor skills required in biting and chewing. These, in turn, interact with the specific skills and needs of the individual child.

This set of chart progressions looks at a variety of foods, and rates them on a 3 point scale of difficulty. These progressions can be used to select foods for a specific child in the development of a long-term program to develop appropriate biting and chewing skills. The more expanded 3-point system allows for subtle gradations of difficulty in each point area. This allows an adult to select foods within the same difficulty category that are on a continuum of subtle challenge for the child.

Suzanne Evans Morris, Ph.D.  
Speech-Language Pathologist  
New Visions  
1124 Robert's Mountain Road  
Faber, Virginia 22938  
(804)361-2285



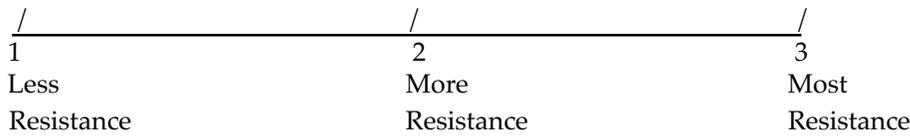
This paper is a working draft and is not to be reproduced without the written permission of the author.

# Sensory Features of Food and Their Challenges for Biting and Chewing

A series of multisensory features of food has been selected for analysis and comparison for biting and chewing. Examples are provided of typical foods for each level of challenge or difficulty. The easiest level is represented by a #1, and the most challenging level by a #3.

## Resistance

Resistance is a measure of the amount of pressure or force required to bite through a piece of food, and chew it into small pieces that can be swallowed easily. Foods with low resistance require very little chewing because they tend to dissolve easily in the mouth. Those with medium resistance are still relatively soft but require some chewing. Foods that create the most resistance require strong, sustained chewing. Many require a grinding motion of the teeth and chewing on both sides of the mouth.



### 1 – Less

Veggie Stix, graham crackers, french fries, well-cooked vegetable dices, peaches, kiwi

### 2 – More

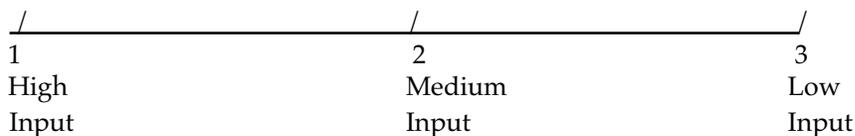
Hard cookies, pretzels, bread crusts, firm toast, oranges, pineapple, fish, chicken

### 3 – Most

Raw vegetables, bagels, beef, pork, dried fruit, raisins

## Sensory Input

Sensory input is a subjective measure of the amount and type of taste and proprioceptive input received by the mouth during biting and chewing. Sensory inputs of crunchy, spicy, sour, bitter, and cold provide the strongest inputs to the oral sensory system. Foods that provide a strong sensory input are often easier to bite and chew because they provide more sensory information for the jaw, tongue, lips, and cheeks.



### 1 – High

Veggie Stix, pretzels, chips, raw carrots, ice chips, pickles, tart apple

### 2 – Medium

Sharp cheddar cheese, saltine crackers, goldfish crackers, hard cookies

### 3 – Low

Mild cheddar cheese, graham cracker, sweet apple

### **Size (Diameter or Thickness)**

The size or diameter of the food determines the amount of mouth opening required for biting and the amount of sustained pressure required to bite through a piece of food. Thinner foods are usually easier to bite through than thicker foods. Size also refers to the size of the piece of food that must be chewed. Smaller pieces require less chewing than large pieces. Although smaller pieces require less overall chewing, they may demand greater precision of movement and a stronger movement to place them between the teeth .

/	/	/
1	2	3
Small	Medium	Large
Size	Size	Size

#### Small

Veggie Stix, graham crackers, soft cookies, small pretzels

#### Medium

Bread sandwich, large pretzels, Gerber toddler meat sticks

#### Large

Hamburger on a bun, bacon lettuce and tomato sandwich

### **Shape (Ease of Lateral Placement)**

The shape of the food strongly affects the ease with which a piece of food can be placed between the side teeth for biting. This is a very important feature for a child who is learning to bite and chew. A wider shape may require biting with the central incisors. If the child is unable to use the tongue to transfer food from the center of the mouth to the side, chewing may be impossible or too challenging. The side teeth are stronger and require less precise holding and bite-through than the central incisors. Thus, foods that are narrower can be placed more precisely on the side for biting and chewing. The shape of many foods can be alternated by cutting them narrower or wider.

/	/	/
1	2	3
Easy	Medium	Difficult
Placement	Placement	Placement

#### Easy

Veggie Stixs, goldfish crackers, animal crackers, long thin pretzels, raw carrot strips

#### Medium

Rectangular graham cracker pieces, thin rectangular cookies, 1 inch toast strips

#### Difficult

Square graham cracker pieces, large round cookie, 1/2 piece of toast or sandwich

## Texture Scatter

Texture scatter refers to the amount of dispersion of pieces, or "scatter" that typically occurs when an individual bites into a piece of food and prepares to chew it. Foods with less scatter retain their basic form as a piece is bitten off. As the food is chewed, pieces stick together, and bolus formation is relatively easy. These are often foods that absorb saliva well and are of a single consistency. Foods with a high degree of scatter break into many small pieces that don't bind together easily. A child with poor coordination of tongue and cheek movement may find individual pieces scattered randomly on the surface of the tongue. Gagging, choking, and food refusal may result from this type of scatter.

/	/	/
1	2	3
Less	More	Most
Scatter	Scatter	Scatter

### Less

Veggie Stix, animal crackers, graham crackers, saltine crackers, cooked fruit and vegetables

### More

Goldfish crackers, Ritz crackers, bread, toast, sandwiches, hamburger on bread, popcorn

### Most

Meat balls, hamburger, raw carrot, nuts

## Consistency

Food consistency is related to food texture. In this context it refers to the number of individual textures that are contained within the food that is offered for biting and chewing. The easiest foods have a single consistency. More difficult foods require the integration of more sensory information during biting, and differential handling of several different consistencies. A multiple consistency food such as an unpeeled apple requires the differential swallowing of the juice, chewing of the pulp, and greater chewing of the peel.

/	/	/
1	2	3
Single	Dual	Multiple
Consistency	Consistency	Consistency

### Single

Veggie Stix, sugar cookies, chips, meat, fish

### Dual

Cookies with nuts, peeled apple, orange slices, watermelon, cooked peas and carrots

### Multiple

Unpeeled apple, grapes

## Placement

Food placement is a feature of the size and shape of the food and the placement choices of the child or feeder. Most foods can be placed in any of the three locations. Some foods are easier with either a side or central placement. For example, corn-on-the-cob is torn off with the central incisors. A caramel or firm piece of meat requiring grinding and chewing is usually placed on the side where the teeth are stronger. Food that is placed on the side requires a simple 1-step chewing process. Food is chewed and then moved from the side to the center for swallowing. Food that is placed in the center of the tongue or between the center and side requires a 2-step chewing process. Food is initially transferred from the center to the side for chewing, and then moved back to the center for swallowing.

/	/	/
1	2	3
Side	Mid-Side	Center
Placement	Placement	Placement

## Side

Any food whose shape and resistance allows placement for biting and chewing in the area of the molar teeth or between the gums in this region of the mouth.

## Mid-Side

Any food whose shape and resistance allows placement for biting and chewing in the area of the canine teeth or between the gums in this region of the mouth.

## Center

Any food whose shape and resistance allows placement for biting and chewing in the area of the central incisor teeth or between the gums in this region of the mouth.

## Transfer

Transfer refers to the amount of chewing needed by a specific food and the choice to transfer the food to the opposite side of the mouth for more chewing. Some foods dissolve or fall apart and are chewed on only one side of the mouth. Other foods retain enough shape that they can be transferred to the other side if desired. Still other foods require extended chewing and a grinding motion that is accomplished most easily when the food is transferred from one side of the mouth to the other.

/	/	/
1	2	3
No	Possible	Yes
Transfer	Transfer	Transfer

## No

Veggie Stixs, cookies, crackers, soft cheese, soft cooked vegetables and fruits,

## Possible

Raisins, raw fruit, sandwich, fish

## Yes

Meat, raw vegetables, caramel candy



may be more comfortable learning to bite and chew a tart apple, a pickle, or a raw carrot than a more typical beginning food such as a graham cracker. Other children with sensory feeding issues are extremely uncomfortable when food must be moved around in the mouth. They may find meats or other foods requiring more extended oral contact and transfer extremely challenging.

### **Feeder and Environmental Variables**

The way in which the feeder creates the mealtime environment, and offers the food will influence the child's sensorimotor skills for biting and chewing. When food is cut in a shape and size that fits the child's mouth and emerging skills, biting and chewing movements are learned with greater ease. When the feeder takes time to position the child so that the body is well-supported by the lap or chair, the child's mouth moves more skillfully. A child who has difficulty with the sensory properties of food, will learn to handle new foods more easily during or after activities that improve overall sensory processing.

## **Self-Exploration for Success**

The most successful way to develop an individualized food progression for biting and chewing is through eating potential foods with a high level of awareness and analysis. Begin by selecting foods from these charts that you think will meet the learning needs of the child. Take several bites of the food and consider each of the sensory features listed for the food. Find out what you experience as you bite and chew the food. What type of sensory awareness and perception do you have as you eat this food? How do you move your jaw, tongue, cheeks, and lips? How easy is it to prepare the food for swallowing?

Observe the child, and notice the general movements that the child uses in handling smooth food, lumpy food, and food requiring biting and chewing. Take several bites of the food as you imitate the typical movements used by the child. If the child has low tone in the jaw, pretend that you have a very weak bite. If the child moves the tongue back and forth with a suckle movement, find out what happens when you place the food in the middle and on the side of the mouth for biting and chewing. Use your own body to explore and discover foods that will be easier or at the right level of challenge for a child with these abilities and limitations. Explore different brands of the same food. If you decide to work with a pretzel, try a number of different brands or shapes. Some will be saltier than others. Some will hold their shape when bitten while others will crumble. Find the best one for the child at this point by selecting from your own experience and observing the child with different pretzels. Expand the child's ability to eat many different types of pretzels by gradually introducing pretzels with slightly different features.

### **Summary**

Different foods offer different degrees of challenge in learning to bite and chew. When we understand the sensory and motor skills required for a specific food, we can select an appropriate learning challenge for the child. Our goal is to choose foods that offer a "just right challenge" and provide maximum success for the child. Over time, the child must have the opportunity to deal successfully with all varieties and combinations of sensory features in food that requires biting and chewing.