Humans are born with the capacity to self-regulate their energy intake and the reciprocal eating/feeding relationship between child and caregiver is known as ‘responsive feeding’. Verbal and non-verbal hunger and satiety signals are communicated by the infant or child and the caregiver response has the capacity to preserve or override these natural fullness signals.

As the importance of early feeding practices and its potential impact on obesity has gained increasing attention from researchers, so has the interest of Early Years professionals in seeking the best advice to offer to parents. This article explores the evidence base around responsive feeding practices and considers if they also play a role in preventing obesity. It also analyses what responsive feeding means in practice and offers tips for feeding responsively.

The evidence for self-regulation
Infants 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 (six weeks onwards), this ability improves and infants can regulate their intake well. At four to six months old, infants have good regulation and can 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). Infants who do not move on to complementary feeds during this time period may continue taking mainly milk feeds well into their second year of life. At this point, it is not easy to move them on to complementary foods and away from milk feeds (Mason et al, 2005, Harris, 2009).

Although most infants are able to self-regulate intake, some infants can not, which can lead to overeating. It is still unclear on whether it is due to the influence from obesity-related genes or early feeding practices (Kral et al, 2007). In early infancy, emptying a bottle or cup has been seen in 68% of exclusively bottle-fed babies compared with 27% of babies exclusively breast fed (Li et al, 2010). In those cases infants may cross upwards on their weight for age centiles during infancy, which is a risk factor for obesity.

Researchers have considered the importance of self-regulation and in 2011 Di Santis et al stated that: ‘The facilitation of self-regulation skills early in life may predict future food intake and optimal responses to hunger and satiety cues.’ It is, therefore, crucial that parents and carers gain the skills required to observe their child’s hunger and satiety cues and respond effectively. For example, babies aged from newborn to three months signal their need for a feed with prompts, such as crying. After this age, infants develop both motor and cognitive skills allowing them to indicate their preference. This is achieved in a number of ways, such as putting their hands in the direction of their mouths/heads, using their bodies/heads to turn or move away from a food or spitting out food when they have had enough (Bronson et al, 2000, Brown, 2011).

Do feeding styles affect child development?
The role that responsive feeding exerts on children goes beyond appetite regulation, it also contributes to child
development. The World Health Organisation (WHO) and The Pan American Health Organization (PAHO) combined forces to produce a useful guideline covering feeding interactions and styles, the feeding situation, strategies for parents to use when children refuse food. It also included practical advice such as self-feeding by offering finger foods, and suggestions on how to attend to the child throughout the meal (Pan American Health Organization/WHO, 2003).

Controlling and indulgent feeding styles exhibited by caregivers may be contributing factors to childhood obesity and nutrition interventions, which include education on responsive feeding, may be a step forward. The guideline states that both over and under feeding have been associated with poor self-regulation of intake and increased weight gain and/or obesity in children. Therefore responsive feeding may represent an opportunity to tackle the underlying causes of overweight in children and may be a key tool in the arsenal for tackling the childhood obesity epidemic (Engle et al, 2011).

The most promising obesity prevention interventions for children aged under two are those that focus on diet and responsive feeding, according to a systematic review on obesity in infancy and early childhood. Breastfeeding uptake and duration, timing of introducing solid food, diet intake and quality, responsive feeding practice and physical activity are all important factors for obesity prevention strategies (Redsell et al, 2013).

In terms of whether responsive feeding during infancy and weaning can help combat obesity, the jury is still undecided. It would seem the link between responsive feeding and overweight is presumed rather than rigorously investigated. Therefore further research with respect to feeding responsiveness, taking into consideration diverse populations and cultures (Ki DiSantis et al, 2011), is required.

**How does responsive feeding work?**

According to UNICEF, responsive feeding - also called active feeding - means to feed infants directly and assist older children when they feed themselves, being sensitive to their hunger and satiety cues. In practice this means being patient and allowing children to feed slowly; encouraging children to eat their food without ever forcing them to do so. As children and infants often refuse food the first time it is presented, new foods should be offered several times; experimenting with different food combinations, tastes, textures and methods of encouragement. Bribing children to eat is not a good long-term solution when it comes to food refusal. Distractions should be minimised during meals as interest can easily be lost. UNICEF also emphasises that feeding times are opportunities for learning and love and recommend that feeding provides an ideal opportunity for socialisation.

**Characteristics of responsive and non-responsive feeding practices**

Appetite regulation involves a complex interplay between hunger and satiety, likes and dislikes and a host of external and internal cues to eat. However, poor responsive feeding practices by parents, including pressure to eat, food restriction and excessive portion sizes, have the potential to override this internal regulation and may be a contributing factor to childhood obesity.

We learn to be hungry when we usually eat and to be hungry for the calorie load of the foods that we usually eat. Children, like adults, can therefore regulate their intake and compensate. Parental anxiety over meal times may be eased if they are aware that a child who consumes a large calorie load at one meal (or drinks too much milk) will often compensate by reducing their intake at subsequent mealtimes.

It is also worth knowing that children aged from three to four years old may respond to external cues to eat in the absence of hunger. For example, just like adults, children may eat because others are eating, or to imitate others’ eating processes. Also, children may eat because food restriction and excessive portion sizes, have the potential to override this internal regulation and may be a contributing factor to childhood obesity.

**An example of active / responsive weaning in practice**

<table>
<thead>
<tr>
<th>Baby:</th>
<th>Caregiver:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fussing and whingeing</td>
<td>‘I think you must be hungry…’ (food is offered)</td>
</tr>
<tr>
<td>Opens mouth and takes finger food to his / her mouth whilst…</td>
<td>Observes baby cues</td>
</tr>
<tr>
<td>Spoon feeds and watches for baby’s response and reads cues</td>
<td>Spoon feeds and watches for baby’s response and reads cues</td>
</tr>
<tr>
<td>Leans forward again and opens mouth</td>
<td>Leans forward again and opens mouth</td>
</tr>
<tr>
<td>Slows down eating</td>
<td>Turns away from the spoon</td>
</tr>
<tr>
<td>Observes baby cues</td>
<td>Trials to offer another spoon of food</td>
</tr>
<tr>
<td>Turns away and shakes head no.</td>
<td>Turns away and shakes head no.</td>
</tr>
<tr>
<td>‘It looks like you are satisfied and have eaten enough today.’</td>
<td>‘I think you must be hungry…’ (food is offered)</td>
</tr>
</tbody>
</table>

**Feeding responses in practice**

<table>
<thead>
<tr>
<th>Responsive</th>
<th>Not responsive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacing the feeding according to the signals from the child</td>
<td>Continues with feeding even though child is showing signs of refusal</td>
</tr>
<tr>
<td>Gentle prompt to eat but withdrawal if child refuses</td>
<td>Forces food into mouth</td>
</tr>
<tr>
<td>Suggest that child might try food but no coercion</td>
<td>Threatens child or withholds liked foods</td>
</tr>
<tr>
<td>Model the eating process</td>
<td>Not sensitive to child’s preferences</td>
</tr>
</tbody>
</table>

Source: Foodtalk CIC

**Common signs of fullness**

<table>
<thead>
<tr>
<th>Birth</th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tries and turns head away from nipple</td>
<td>Turns away from spoon</td>
<td>Throws food</td>
</tr>
<tr>
<td>Sucks slowly and / or stops sucking</td>
<td>Holds food in mouth</td>
<td>Signals or says ‘no’ to unwanted food or food that is disliked</td>
</tr>
<tr>
<td>Pushes nipple from mouth</td>
<td>Uses tongue to push food out</td>
<td>Becomes distracted by toys during meals</td>
</tr>
<tr>
<td>Shows facial expression of disapproval, pain</td>
<td>Closes mouth tightly</td>
<td>Shows disgust at the disliked food</td>
</tr>
<tr>
<td>Shows disgust and gags at the disliked food</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Foodtalk CIC
eating behaviour. The desire to ‘comfort eat’ and what is left on the plate are interactive behaviours that can also lead to over-eating and obesity.

**How responsive feeding works during infancy**

The ability to recognise hunger and fullness signals given by an infant is the vital first step in responsive feeding. Common signs of hunger include fussing, whining or an acceleration to crying, as well as gnawing on hands, fingers or thumb. However, research shows that whereas parents and caregivers are fairly adept at recognising a baby’s hunger, they are less so at recognising signs of fullness. Ongoing feeding even after full cues are given is a common practice among parents. Unfortunately, encouraging babies to finish all of the milk from bottles and food from jars and plates - known as ‘empty plate syndrome’ - is widely practiced by parents and caregivers. In doing so, they disregard their baby’s natural instinct to stop eating. In the long run, overfeeding a child increases the risk for overeating and therefore increase the likelihood of excessive weight gain.

There are ways to help ensure effective responsive feeding in infancy and these are relevant to both the exclusively breast-fed and/or bottle-fed child. These include:

- Observe feeding cues, e.g. putting hands in mouth
- Hold the baby close to observe for signs of fullness
- Encourage ‘rooting’
- Invite the baby to take the teat of the bottle, rather than forcing the teat into the mouth
- Pace the feed by stopping to wind periodically
- Never force a full feed if fullness signals are indicated
- Limit who feeds the baby to help establish the recognition of hunger & satiety cues.

**How to encourage responsive eating during mealtimes:**

1. Create positive mealtime interaction – face your baby and ensure eye contact when feeding.
2. Use positive role modelling such as trying new foods with your child and eating meals as a family.
3. Avoid distractions whilst eating – create a calm mealtime environment.
4. Let the child lead on pace.
5. Follow the child’s hunger and fullness signals.
6. Decide what to offer – parents should provide a variety of nutritious foods.
7. Let the child decide how much they eat and whether they eat it or not.
8. Offer a variety of tastes and textures – including finger foods during weaning.
9. Never force a child to finish a bottle or the food on their plate, follow their signs of fullness.
10. Take uneaten food away without comment.

Further information

www.foodtalk.org.uk (@foodtalkRD)

Foodtalk is a London-based Community Interest Company specialising in the delivery of nutrition and dietetic services within local communities.

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