The uses and abuses of snack foods in child health

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Abstract

Snack foods though regarded as unhealthy, are widely eaten by children, particularly those with eating and feeding difficulties. This article outlines the ways in which paediatricians have traditionally made use of snack foods as incentives and then reviews the key nutritional and practical characteristics of commonly eaten snack foods, to allow practitioners to evaluate their role in the child's diet. Generally savoury snacks are preferable to sweet, while dry foods are preferable to drinks or semi liquid desserts. Many ostensibly healthy snacks are also rich in sugar or fat. Eaten in addition to other meals, snack foods may lead to obesity or else displace family foods, but the instant appeal of snack foods can be exploited to introduce young children to otherwise aversive sensations and tastes and can proved useful path towards a more diverse future diet. If a reasonable variety of snack foods are taken, this will still form a fairly balanced, if non ideal diet.

Introduction

In the modern age of obesity, sweet foods and high energy snacks are now so cheap that they may become major source of energy in a child's diet. Children have an inherent liking for sweet tastes [1] but the consumption of sweets has long been discouraged to avoid dental caries[2] as sweet foods and drinks pose the highest caries risk when eaten between meals [3]. But they also impact on the intake of more nutritionally complete foods; preschool children will eat on average 70% less at a meal preceded by a high energy drink or food, compared to a low energy one[4]. In addition foods eaten between meals can easily become a 'reward' for not eating at meals.

Despite this, there is a long tradition of the use of confectionary in Child Health, mainly to persuade children to do things they don't want to do. Traditionally 'a spoonful of sugar helped the medicine go down' and the use of sugar within liquid formulations places children on long term medication at increased risk of dental caries[5]. Most recently sucrose has been shown to be an effective analgesic in extremely preterm neonates and infants undergoing procedures[6]. In Community child health we used to hand out lollipops after immunisations, and raisins are still used to demonstrate the pincer grip. The Marshmallow test is much talked of, though it does not form part of the usual Child Health Test battery, but for some years I have been collecting a range of versions of the Chocolate Biscuit Test (see box).

However, not all children are nutritionally equal. Working in a specialist feeding clinic[7 8], we see many children with extreme dietary variants, ranging from those who have never eaten solid food, through highly selective eaters, to those who strive to eat in the face of huge physical impediments. For all these children, snack foods – being immediately palatable and rewarding - tend to be the first stop on their journey towards a fuller oral diet. The secret of success in our clinic is to use these highly palatable foods to offer instant reward for the act of eating. Children who have never eaten solid food of any kind are more likely to overcome their fear of solid matter in the mouth to eat foods such as chocolate biscuits – the reward of the sweet fix making it worthwhile. Of course we then have to help these children move on to a more diverse diet, but for some children with complex neurodevelopmental problems, the highly energy-dense and easy-to-eat diet that snack foods provide

may be ideal. While many families in the clinic are inventive and pragmatic in the face of often bizarre eating behaviour, some are oppressed by their child's liking for 'bad foods'. We thus have to explain to parents that none of these foods are actually poisonous. The question is one of timing and quantity: how to arrive at a combination of different snack foods which will provide sufficient nutrient balance, or act as a gateway to better habits in future. It is likely that the question of what, and how many, snacks children could safely eat arises in a wide range of clinical settings, so it seemed helpful to summarises the key features, strengths and weaknesses of different snack foods for a wider audience.

Method

Snack foods were defined as foods that can be eaten without cooking or with only minimal preparation. Examples of snacks were selected which are commonly eaten between meals by young children in the UK. Using the websites of 2 UK major supermarket chains as well as company websites, the energy content per portion size and energy density (content per 100g) were extracted and the fat, sugar and salt content classified using the traffic light system[9]. When a portion size was not shown this was estimated form other similar products.

Results

The table summarises a demonology of junk foods and drinks. Top of the list come sugared soda drinks, which provide almost entirely 'empty calories': defined as energy rich foods lacking other macro and micro nutrients. Fruit juices now come a close second, being equally sweet, with only the added benefit, for some, of vitamin C. Fruit smoothies may seem to provide fruit in an acceptable form, but are often extraordinarily sweet and provide no experience to the child of the texture or individual taste of fruits. All these drinks provide energy which is largely unconsciously consumed and in some children will be an important contributor to obesity [10] while for others they dull the appetite for more nutrient rich sold foods.

Chocolate and confectionary have little apart from sugar and fat in the way of nutrients, but they are at least solid matter and provide a major hedonic incentive to attempt to bite and chew. Chocolate buttons in particular are often used to accustom a child to taking solid food into the mouth which then melts without the need to chew; note families should try this only at home as chocolate infallibly melts in children's hands and spreads all over the consulting room. The risk from all confectionary is that of dental caries, particularly with sticky sweets[11].

Cakes are uniformally high in both sugar and fat and thus highly energy dense, but there is a huge variation in portion size, so that one muffin can cancel out the energy expended on a 2 hour walk. Cakes provide little oromotor challenge, but the advantage of this for the undernourished child with limited oral skills is that they can be crumbled into low energy dairy desserts to greatly increase energy content. They are actually not widely eaten by young children, possibly because the same tendency to crumble makes them unmanageably messy (see Figure 1). Biscuits in contrast are immensely popular with children and also extremely energy dense. They help develop biting and chewing skills, but melt in the mouth leaving little mess and are less sweet than confectionary.

Breakfast cereals can be a useful way to get milk into the diet of child, but they are often in fact eaten dry, as another energy dense sweet snack. They are highly fortified with various vitamins and minerals, which may give them an edge. Dairy desserts are immensely popular and can be a useful low energy sweet food, but they present almost no oromotor challenge and contain little other

than milk and sugar, so they are not helpful in moving children on to solid or savoury food. Ice lollies may be useful to persuade a very orally averse child to take solid matter into the mouth which doesn't then have to be chewed or manipulated, but their energy content and healthfulness varies greatly (see Figure 2).

The problem with using an intensely pleasurable food to encourage the development of oral skills is that the child will often then be unwilling to eat anything else. Thus to avoid developing an entirely sweet diet, savoury snacks such as crisps and corn snacks are a preferable first option for a solid, melt in the mouth food, with which children can learn to finger feed. Savoury snacks are appealing to children because of their high fat and, usually, salt content, which may impact on their taste for salt long term and possibly their future cardiac and renal health[12]. However crisps (but not corn snacks) are far from being empty calories, also supplying protein, fibre and vitamin C. The same is true of French fries, which also require more manipulation and chewing. Other savoury snacks may fill useful niches – the sausage roll is often seen being eaten in a baby buggy and usefully supplies protein and haem iron, while pizza slices supply a range of tastes and a challenging texture. Thus savoury snacks can fill a useful niche in the diet of toddlers who still have high energy requirements, small stomachs and relatively restricted eating skills.

So what about the healthy alternatives? Flapjacks include healthy sounding ingredients like oats and dried fruit, but usually also have a high sugar and fat content, making them just as calorific as cake. Dried fruit are in fact very sweet and energy dense, and it is thought that much of any vitamin C content is lost in the drying process, though they do usually require quite vigorous chewing. Banana chips manage to be high in both sugar and fat. Plain rice cakes are mainly air, making them a good low energy snack, but beware the sweetened cakes which may have more calories than a conventional biscuit. Oatcakes have a very high fat content, so even though unsweetened, they rival the energy content of much less respectable biscuits. Cheese is savoury, but high fat and thus very energy dense. This makes them excellent savoury foods to supplement a meagre diet, but these are not low energy snacks!

Conclusions

The reason foods are chosen as snack foods is because they are easy to eat and instantly rewarding. Eaten in addition to other meals, snack foods may easily push a child into positive energy balance and obesity and if provided injudiciously will displace less rewarding family foods. Unfortunately many ostensibly healthy snacks are also rich in sugar or fat. However the very deliciousness of snack foods can be exploited to introduce young children to otherwise aversive sensations and tastes. When weighing up the role of snacks in the diet, the child's individual nutritional requirements should be considered, but generally savoury food are preferable to sweet and dry foods are preferable to drinks or semi liquid desserts. If a reasonable variety of snack foods are taken, this will still form a fairly balanced, if non-ideal diet. A little of what you fancy does you good, but variety is the spice of life.

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I have no financial interest in any food manufacturer and have never received financial or other benefit from such companies. All sampling of relevant products has been at my own expense, in every sense.

Transparency declaration

The author affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

Contributorship

This is a sole author document

Box

Snack food based tests in childhood

The Marshmallow test:

A test of a child's ability to defer gratification.

- A child is presented with one marshmallow, but told if s/he waits 15 minutes without eating it s/he can have two.
- Most children attempt to delay eating the marshmallow, but only a third succeed[13].

The chocolate biscuit tests:

(1) When told that that a child is off his food, you ask "would they eat a chocolate biscuit?" If the answer is yes, the likelihood of underlying pathology is low.

(2) A quantifiable version: keep a plate of biscuits in the consulting room and count the number of biscuits the child eats during the session.

(3) If a child can eat a chocolate biscuit without difficulty, he cannot be said to have significant oromotor or swallowing difficulties

Table: nutritional characteristics of commonly eaten snack foods

		Energy content (kcals) per		Traffic light classification[9].		
Food or drink	**Standard portion size**	**serving**	**100g**	**Sugar**	**Fat**	**Salt**
Carbonated drinks	330 mls	139	42	High	Low	Low
Fruit juices	Apple juice 250 mls	108	60	High	Low	Low
	Orange juice 200mls	95	47	High	Low	Low
	Fruit smoothie 200mls	108	54	High	Low	Low
Chocolate	30g Chocolate buttons	159	530	High	High	Low
Confectionary	55g Mars bar	230	450	High	Medium	Medium
	56g Jelly babies	87	330	High	Low	Low
	45g Fruit chews	182	405	High	Medium	Low
Cake	Mini Chocolate swiss roll	115	435	High	High	Medium
	Fairy cake / muffin	73- 417	368-430	High	High	Medium
	Flapjack slice	147-225	445	High	High	Low
Dried fruit	Banana chips 30g	166	524-63	High	High	Low
	Dried mango 30g	95	315	High	Low	Low
	Raisins 14g	41	293	High	Low	Low
Biscuits	Jammie dodger	75	420	High	Medium	Low
	Oreo	53	480	High	Medium	Medium
	Digestive	71	481	Medium	High	Medium
	Rice cake (plain)	29	386	Low	Low	Low
	Rice cake (sweetened)	51-82	392-493	High	Low-Medium	Medium
	Oat cakes	39-56	446-73	Low	High	Medium
Breakfast cereal	Coco pops 30g	117	389	High	Low	Medium
	Cheerios 30g	113	378	Medium	Medium	Medium
	+125mls milk	174	112	Medium	Medium	Low
Dairy desserts	Fromage frais 85g	81	95	Low	Medium	Low
	Yoghurt 100g	95	95	Low	Medium	Low
	Custard 120g	119	99	Low	Medium	Low
Ice lollies	Fruit juice based	23-75	63- 107	Medium	Low	Low
	Chocolate based	138- 342	293-355	High	High	Low
Crisps /chips	Ready salted crisps 32.5g	171	526	Low	High	Medium
	Corn snacks 16g	85 kcal	534	Low	High	High
French fries	Microwaved French fries 100g	174	174	Low	Medium	Low
	Medium fast food Fries 114g	337	295	Low	Medium	Medium
Bakery products	Sausage roll 103g	339	329	Low	High	High
	Pizza slice (margherita) 150g	399	266	Low	Medium	High
Cheese	Processed Cheese slice 25g	64	255	Medium	High	Medium
	Cheddar cheese slice 25g	98	390	Low	High	High

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Figure 1 Child eating cake surprisingly tidily

Figure 2: An ice lolly may be an incentive to learn new feeding skill