

IN BRIEF

- Nutrition plays a central role in the aetiology of a range of chronic conditions. It is essential that any dietary advice given to promote oral health is in accordance with general nutritional messages.
- Although few high quality studies have successfully altered the diet to promote oral health, evidence-based guidelines in other areas of nutrition provide a useful guide to providing dietary support in a clinical dental setting.
- The aim of this paper is to review the evidence linking diet to oral health and to outline the steps involved in providing dietary advice and support to dental patients.

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Prevention. Part 2: Dietary advice in the dental surgery

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Oral health is directly related to diet and nutrition. Dental caries remains the most significant dental public health problem in the UK and concerns have been expressed over the potentially rising prevalence of erosion. Both these conditions are linked to dietary factors. The dental professional and their teams therefore have a role to play in supporting their patients in adopting appropriate dietary habits.

PREVENTION

1. Smoking cessation advice
2. Dietary advice
3. Prevention of tooth wear
4. Toothbrushing advice
5. Patients requiring osseointegrated oral implant treatment
6. Older dentate patient
7. Professionally applied topical fluorides for caries prevention
8. Pit and fissure sealants in preventing caries in the permanent dentition of children

Reviews of oral health education and promotion interventions have highlighted the limited number of high quality studies aimed at altering diet to promote oral health.¹⁻⁵ However better quality evidence from randomised controlled trials with other primary health care professionals have highlighted the impact of dietary advice on changing dietary patterns.⁶ Evidence-based guidelines now outline ways of helping patients improve their diets. This paper will provide an overview of the importance of diet on oral health and outline practical steps that can be taken within primary dental care settings to promote healthier eating patterns. The provision of dietary advice in dental practices also provides an ideal opportunity to involve and develop a team approach to patient care.

EVIDENCE ON DIET AND ORAL HEALTH

A great deal of research has been undertaken over many years into the relationship between diet and oral health. Although the totality of evidence is clear with an international scientific consensus, media coverage still frequently highlights the findings of controversial and isolated studies. As health professionals, dentists should base any advice they provide to their patients on the scientific consensus view.

Many different terms have been used to name and classify sugars. This has caused a degree of confusion amongst both the general public and health professionals. In recognition of this an expert Government committee (COMA) have

recommended a revised naming system which has now become the standard classification of sugars in the UK.⁷ The COMA classification is based upon where the sugar molecules are located within the food or drink structure. Intrinsic sugars are found inside the cell structure of certain unprocessed food stuffs, the most important being whole fruits and vegetables (containing mainly fructose, glucose and sucrose). Extrinsic sugars, in contrast are found outside of the cells of the food and drink. There are two types of extrinsic sugars, milk extrinsic sugars and non milk extrinsic sugars (NMES). The extrinsic milk sugars include lactose found in dairy products such as milk and milk products. NMES are found in table sugar, confectionery, soft drinks, biscuits, honey and fruit juice.

Table 1 summaries the evidence on diet and oral health based upon expert scientific reviews.^{7,8}

Based upon the available evidence, consensus recommendations advocate the following points:^{7,8,10,11}

- The frequency and amount of NMES should be reduced. NMES consumption should be restricted to mealtimes when possible.
- Limit consumption of NMES to a maximum of four times a day
- NMES should provide no more than 10% of total energy in the diet and not exceed 60 g per day per person
- Consumption of intrinsic sugars and starchy

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Table 1 Consensus view on diet and oral health

- The influence of the diet is more important after the teeth have erupted. The pre-eruptive effect of diet on oral health is minimal.
- Non milk extrinsic sugars (NMES) are highly cariogenic.
- Frequency of eating/drinking NMES is important in caries development. However, frequency of intake and amount consumed are closely correlated.
- Intrinsic sugars eg fresh fruits and vegetables and cooked staple starchy foods such as rice and potatoes are of low cariogenicity. Milk extrinsic sugars eg milk are virtually non cariogenic.
- Alternative or non-sugar sweeteners (bulk and intense) are non-cariogenic.
- Frequent consumption of acidic drinks may be linked to the development of dental erosion

Modified from Rugg-Gunn⁹

Table 2 Eight guidelines for a healthy diet

1. Enjoy your food
2. Eat a variety of different foods
3. Eat the right amount to be a healthy weight
4. Eat plenty of foods rich in starch and fibre
5. Eat plenty of fruit and vegetables
6. Don't eat too many foods that contain a lot of fat
7. Don't have sugary foods and drinks too often
8. If you drink alcohol, drink sensibly.

Health Education Authority, 1997¹²

foods should be increased to five pieces/ portions of fruit/vegetable per day.

It is essential that any dietary advice provided by dental health professionals is in accordance with general nutritional recommendations for good health (Table 2).^{12,13} Oral health advice on diet must therefore not result in any increases in, for example, saturated fat intakes. In the past, well meaning oral health advice on reducing sugary snacks often resulted in an increase in fatty snacks such as crisps.

OVERVIEW OF SUGARS CONSUMPTION

Sugar has played a prominent role in British economic and political history for many centuries. In recent decades the pattern of eating in the UK has changed radically in response to wider social changes across society. From a peak in consumption in the 1950s following relaxation of war-time rationing, sugar consumption has gradually reduced. However a radical change has taken place in the pattern of consumption. There has been a large reduction in consumption of visible or table sugar (added to tea/coffee, breakfast cereals etc) and instead an increase in hidden sugars consumed in processed or manufactured foods and drinks.¹⁴ These changes have important implications for preventive actions to promote health. Table 3 lists the sugars contents of certain popular foods and drinks.¹⁴

The majority of the UK population consume more NMES than the recommended 60 g/day,

although many want to reduce their intakes, often to lose weight. Particular concern focuses on the high levels of consumption amongst pre-school children, adolescents and older people. A range of barriers prevent individuals from changing what they eat (Table 4). Indeed certain groups in society have limited control over what they chose to eat. It is important for health professionals to be aware of the factors influencing their patients' dietary patterns. Taking a detailed history, setting realistic goals and monitoring any change are all essential steps in supporting patients in altering their eating habits.

EVIDENCE ON DIETARY INTERVENTIONS IN PRIMARY CARE

Very few well designed dietary interventions have been undertaken within primary dental care settings to demonstrate the effectiveness of different interventions.¹⁻⁵ This does not mean that there is no point in dentists providing dietary advice. Instead it highlights the need for better quality research into this area. Population-based interventions have shown that sugar consumption can be substantially reduced through the introduction of policy guidelines.¹⁵ This demonstrates that sugar consumption is amenable to change given appropriate support.

A larger body of research has been undertaken to change dietary risk factors for systemic conditions such as cardiovascular disease and stroke. In a meta analysis of studies aimed at reducing dietary risk factors through advice in primary care settings, modest dietary changes were achieved which were estimated would result in a 14% reduction in CHD incidence and a 9% reduction in the incidence of stroke.⁶ A systematic review of dietary interventions in primary care has highlighted characteristics of effective dietary interventions (Table 5).¹⁶

The challenge for the dental profession is how to translate these general guidelines into action that will facilitate a reduction in NMES consumption. The following section will outline practical steps dental practitioners and their team members can adopt to support patients adopt healthier eating patterns.

STEPS IN DIETARY COUNSELLING

Based upon evidence-based guidelines,¹⁶ a six step model can be followed to ensure that

Table 3 NMES content of popular foods and drinks

Food/Drink item	Percent NMES	Grams per serving
Coca cola regular	10.5	35.0
Ribena regular	14.0	40.0
Lucozade regular	17.9	61.8
Sunny Delight	9.8	49.0
Nestle Kit Kat	60.2	29.3
Fruit Pastilles	82.9	46.1
Kellogg's Frosties	38.0	11.2
Quaker Sugar Puffs	49.0	14.7
McVitie's Jaffa Cakes	52.0	13.0

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dietary counselling is provided in a systematic and comprehensive fashion for those patients who need preventive support (Fig. 1). A clear and detailed account of each step is provided by Rugg-Gunn, and Nunn.¹⁷

Step 1: Identify higher risk patients

All patients should routinely be given appropriate dietary advice to maintain their oral health. For most patients this will involve a brief mention of any relevant dietary information following their clinical examination. Visual information in the form of leaflets and posters may provide reinforcement and help raise awareness of the importance of maintaining a healthy diet. For example, posters highlighting the sugar contents of popular foods and drinks may stimulate interest and motivation.

Patients with a high caries experience or evidence of erosion will require a more detailed level of support. This may apply to certain groups in particular such as pre-school children, adolescents, individuals on long-term medication and dentate older people. In addition people living in poverty may be at high risk of diet related oral health problems. Any individual at high risk of developing further oral disease should have a dietary history undertaken to determine the nature of the potential dietary problem.

Step 2: Take a dietary history

A detailed assessment of nutrient intakes is a complex, time-consuming and skilful task. Within primary dental care settings the purpose of conducting a dietary assessment is not to establish precise nutrient intakes, instead it is designed for the collection of dietary information most relevant to oral health. The key information required for this purpose is the following:

- Establishing the number of intakes per day and how many of these were snacks.
- Identifying the number of intakes that contained NMES
- Assessing whether any intakes containing NMES were taken within 1 hour of bedtime.

The most effective and feasible manner of collecting this information is through a 3-day dietary record. For three consecutive days, one of which must be on a weekend, patients are required to keep an account of all their food and drink intakes. This account should include the following information:

- Time of food or drink intake and whether eaten away from home
- Description of type of intake
- Assessment of amount of intake
- Time of going to bed

To undertake this task patients need to be very motivated and have a clear understanding of the purpose of the activity. Precise instructions on how to complete the dietary record

Table 4: Barriers to reducing NMES intakes

Individual level

- Lack of motivation to change – enjoy taste of sugary foods and drinks
- Lack of confidence to change – previous attempts have failed
- Lack of information – not clear which foods contain sugars
- Lack of skills – unable to prepare and cook healthier foods

Social level

- Peer group pressures – everyone else eats chocolate at coffee time
- Lack of time – too busy to cook
- Family pressures – husband and children will not eat vegetables
- Cultural food beliefs – sugar is needed for energy

Environmental level

- Healthier choices too costly – high costs of healthier snack foods and drinks
- Limited choices available – tuck shops only stocks soft drinks and confectionery
- Advertising pressures – children demand latest gimmick food as seen on television

Table 5 Evidence-based dietary guidelines

- Interventions should be developed from behavioural theory and should incorporate well defined goals. Information alone has only a limited impact
- Personal contact is important in motivating and monitoring change. A detailed history is required to ascertain all relevant background information
- Interventions should be tailored to individual's personal circumstances and ability to change
- Provision of feedback on dietary changes are important
- Multiple contacts over a period of time are more likely to achieve desired goals
- Encouragement and support from family and friends is essential to motivate and maintain change

Roe *et al.*¹⁶

should be given, both verbally and in a written format and the patient should be given the opportunity to ask any questions. Honesty, focus and motivation are required by the patient to complete the task accurately to avoid excessive reporting bias.

Information gathered and analysed from the diet record will provide a picture of any dietary issues that may be linked to the patient's oral health problems. Appropriate goals and an action plan can then be developed.

Step 3: Set goals

A reduction in the amount and frequency of NMES consumption is the ultimate aim of dietary advice to promote good oral health. Setting goals which are realistic (can they be achieved?), appropriate (do they take into account the individual's circumstances?) and measurable (can progress be gauged over a relatively short time frame?) are important.

Soft drinks, confectionery, and biscuits and

Fig. 1 Six step dietary counselling model

- Step 1: Identify higher risk patients
- Step 2: Take detailed dietary history
- Step 3: Set goals
- Step 4: Develop action plan
- Step 5: Monitor and review
- Step 6: Refer if necessary

cakes are the main sources of NMES for the majority of the population. Setting goals to reduce the consumption of these items is most likely to achieve an effect on overall NMES levels. A phased programme of reduction may help patients through a gradual alteration in their taste thresholds. Any goals need to be agreed and understood by the patient. Imposing goals on someone achieves very little.

Step 4: Develop action plan

To successfully meet agreed goals requires the development and implementation of an action plan. Dietary interventions which are tailored to the circumstances and needs of the individual are more likely to achieve desired outcomes.¹⁸ Reviewing any past experiences in changing eating patterns may reveal useful information on ways of addressing barriers to achieving sustained changes. For example, many people report the difficulties of coping with stress and excessive pressures without resorting to chocolate or sweet eating. Discussing alternative ways of dealing with stress could be very important.

Eating is a social activity influenced by a wide range of factors. Patients therefore need to enlist the support of their family and friends. Reflecting on the information gathered in the dietary history may identify particular times of the day when NMES are more likely to be consumed, for example, coffee breaks. Suggesting ways of altering these routines may make a real difference. Providing practical advice on alternative foods and snacks which will help reduce NMES intakes are really important (Table 6).

Table 6 Suggested foods and snacks

- Fresh fruit
- Raw vegetables
- Breadsticks
- Crackers
- Rice cakes
- Crumpets
- Currant buns, scones or teabreads
- Plain popcorn
- Savoury sandwiches, crispbreads, or pitta breads
- Water
- Milk (skimmed or semi-skimmed)
- Diluted fruit juices

Step 5: Monitor and review

With any attempt at changing behaviour, monitoring and reviewing progress is fundamentally important. There is no point spending time with a patient assessing their diet, agreeing goals and an action plan and then not seeing them again for year or so. Patients need on-going support and feedback to achieve sustained changes in their eating habits. Once an action plan has been agreed, reviewing progress within a few weeks would be ideal. Patients undergoing a course of dental treatment can have their progress assessed briefly at the end of a clinical appointment.

Step 6: Refer

In certain circumstances dietary problems may be identified which require expert guidance and support. For example, individuals who are on special diets, have a particular medical condition or have extreme dietary patterns are all beyond the expertise of dental professionals. In these cases it is best to refer the patient either to their general practitioner or a state registered dietitian for more detailed assistance. Conditions such as anorexia nervosa and bulimia may initially present with oral signs but require expert treatment and management.

TEAM APPROACH

As in any other area of clinical practice, providing dietary advice to patients is likely to be more effective when the whole dental team is actively involved.⁴ Designating the appropriate roles and responsibilities of individual team members is a critical first step. Frequently due to pressures of time and in recognition of their clinical expertise, the primary role for dentists may be in the identification of patients who need dietary support and the overall co-ordination of future action. Through a detailed clinical history, dentists should be able to identify individuals who are at greatest risk from caries and erosion due to their dietary behaviour. Dentists have a professional responsibility to highlight the nature of the problem with the patient and the need for action. Delegation to appropriately trained dental nurses or hygienists for a more detailed dietary assessment and action planning may then be undertaken. Dentists however need to ensure that progress is fully monitored and reviewed at regular intervals.

CONCLUSION

Changing what people eat is not an easy task. Dentists and their team members have a responsibility however to promote and maintain the oral health of their patients. Taking a dietary history, setting appropriate and achievable goals, and developing an action plan will help patients in their attempts at controlling their sugars consumption. In addition to tailored dietary advice in the dental surgery, other public health measures aimed at the wider influences on dietary patterns are also needed to promote health and reduce inequalities across the population.

RECOMMENDATIONS: DIETARY ADVICE IN DENTAL SURGERY

1. Dietary advice should primarily aim to reduce the frequency and amount of sugary foods and drinks consumed and should be in accordance with general diet guidelines (Type 3 Evidence).
2. A dietary history should be taken to identify the pattern of sugars consumption in patients at risk of developing future caries (Type 3 Evidence).
3. Appropriate goals and an action plan should

As in any other area of clinical practice, providing dietary advice to patients is likely to be more effective when the whole dental team is actively involved

be agreed with patients on the best means of reducing sugars consumption (Type 3 Evidence).

4. Progress with dietary changes should be monitored and reviewed. Any patients with special or complex dietary problems should be referred to their general practitioner or a state registered dietitian for detailed support (Type 3 Evidence).

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