Nutritional Consideration in Some Head and Neck Diseases

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Michael Perry

Malnutrition has been associated with increased risk for infection, poor wound healing, immunocompromise, increased length of hospital stay, increased mortality, and increased hospital costs. Patients may require nutritional support for a number of reasons. Sometimes this is as a result of their disease, other times as a result of self neglect. In the head and neck the more common reasons include severe injuries, spreading infection and cancers involving the head, face or throat. In other patients treatment itself may hinder adequate intake. Causes of poor nutrition in head and neck patients includes,

1 Unconscious, confused or agitated patients (for example following craniofacial trauma, stroke)
2 Complex facial injuries and their repair (which may make swallowing painful)
3 Prolonged IMF (rarely required, but occasionally needed following repair of complex injuries, or orthognathic surgery)
4 Major infections (especially those affecting the ability to swallow)
5 Patients with cancers involving the mouth, jaws, throat and neck.
6 Pre existing self neglect

All these patients are likely to require nutritional support over a variable period of time. Depending on the underlying cause, this may be in the form of texture modification, nutritional supplementation or enteral feeding. Traditionally when we think of nutritional requirements we tend to think of proteins, carbohydrates and fats. Whilst these are of course important it is important not to forget the role of vitamins and trace elements. Deficiencies in these can become significant with long standing malnourishment or chronic metabolic states. Each substance plays a key role in health, including the ability to fight infection, recover from disease and heal

M. Perry (✉)
London Northwest University Hospital, Harrow, Middlesex, UK

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wounds. Vitamin and trace element deficiencies can therefore have wide reaching effects. Some examples include

Vitamin A (retinol). Found in dairy produce, eggs, fish oils, and liver. Deficiency can affect the eyes and skin, resulting in night blindness, xerophthalmia, keratomalacia and hyperkeratosis.

Vitamin B1 (thiamine). Found in cereals, beans and whole-wheat flour. Deficiency results in beri-beri (a peripheral neuropathy), cardiac failure and Wernicke–Korsakoff syndrome.

Vitamin B2 (riboflavin). Found in whole-wheat flour, meat, fish and dairy produce. Deficiency results in oral mucosal problems and peripheral neuropathy.

Vitamin B3 (niacin). Found in fish, liver, nuts, and whole-wheat flour. Deficiency results in dermatitis, diarrhoea, dementia.

Vitamin B6 (pyridoxine). Widespread distribution. Deficiency results in peripheral neuropathy, convulsions, and sideroblastic anaemia.

Vitamin B9 (folic acid). Deficiency results in megaloblastic anaemia and oral symptoms.

Vitamin B12 (cyanocobalamin). Deficiency results in megaloblastic anaemia, peripheral neuropathy, subacute combined degeneration of the spinal cord depression, psychosis, and optic atrophy.

Vitamin C (ascorbic acid). Found in fruit. Deficiency results in scurvy (bleeding gums, bruising, failure of wound healing) and anaemia.

Vitamin D (cholecalciferol) Found in fish liver oils, dairy produce. This requires metabolism in the kidneys and the skin. Deficiency results in rickets and osteomalacia (in adults).

Vitamin E (alpha-tocopherol). Found in green vegetables and vegetable oils. Deficiency results in haemolytic anaemia and neurological problems.

Vitamin K. Found in green vegetables. Deficiency results in coagulation defects

Copper deficiency results in anemia, Wilson's disease, impaired bone mineralization and Menks' kinky hair syndrome (growth failure, mental deficiency, bone lesions, brittle hair, anaemia).

Iodine deficiency results in hypothyroidism and goiter.

Magnesium deficiency results in cardiac arrhythmias, paraesthesia and tetany.

Zinc deficiency results in growth retardation, hair loss, severe diarrhoea, candida and bacterial infections, impaired wound healing, skin ulcers, alopecia, night blindness and neurological symptoms.

Other, rarer trace elements include rubidium (Rb), selenium (Se), strontium (Sr), molybdenum (Mo), manganese (Mn), lead (Pb), arsenic (As), chromium (Cr), cobalt (Co), vanadium (V), and cadmium (Cd). Patients who are unable to eat adequately may also have difficulty in maintaining sufficient fluid intake. Although fluid balance is usually overseen by the medical team, both fluids and nutrition go hand-in-hand and should not be considered separate from each other. Any soft or drinkable nutrition also contains water.

Although cancer patients have the greatest need for support (discussed below), it is important to remember that all patients are at risk if their disease or its treatment impairs their ability to intake sufficient nutrition. Many of the principles discussed for cancer patients therefore hold true for these other groups.

5.1 Nutritional Requirements in Head and Neck Cancer

For patients who are diagnosed with a head and neck malignancy, ensuring adequate nutritional provision becomes a key focus of their treatment pathway. While the cancer itself is often the cause of significant weight loss (due to the side effects of tumour growth and changes in energy expenditure), the treatment pathway can also significantly contribute to malnutrition. This is for a number of reasons

1 Prolonged surgery/complications can increase energy requirements
2 Complex surgery may hinder the ability to chew and swallow effectively
3 Radiotherapy/chemotherapy can result in mucositis of the oral cavity and loss of appetite.

Some studies have shown that around 75-80% of patients experience substantial weight loss during treatment. Any patient in a catabolic state (seen during prolonged illness or after major surgery) is at high risk of loosing weight. Cancer surgery, major infections, complex trauma and prolonged spells on the intensive care unit are all risk factors. It is therefore essential that the patient's nutritional status is monitored right from diagnosis. This should not only include their weight, but also their symptoms such as dry mouth, pain on eating, reduced appetite, ability to swallow and changes in taste. These symptoms can all lead to significant weight loss and malnutrition if left untreated. However, if caught in the initial stages support can be given to prevent this. Some specialist head and neck oncology units now use screening tools such as Subjective Global Assessments (SGA) and Malnutrition Universal Screening Tool (MUST) to aid early recognition. Patients need for nutritional support may vary greatly, depending on the stage of their treatment.

1. Pre treatment
2. Post surgery
3. During radiotherapy and post radiotherapy
4. Post treatment and following discharge

5.1.1 Pre treatment

During this stage the patient may be experiencing difficulties in swallowing, reduced airway protection and pain in the mouth or jaw on chewing. Current nutritional strategies to overcome these issues focus on enhancing the frequency and energy density of the foods which the patient can tolerate. This may require alterations in the texture of the food to make swallowing easier and to reduce pain (see textured diet, below).

If patients are experiencing significant difficulties despite these adaptations the Dietitian may request the prescription of nutritional support supplements to help meet full nutritional requirements.

The focus of treatment at this stage is therefore to optimise safe oral nutrition and maintain adequate intake.

5.1.2 Postoperative Feeding

Patient who have under gone major or complex surgery usually have increased nutritional requirements due to their normal catabolic state during healing. This is often called the 'stress response' and is seen after trauma, surgery (a form of trauma) and severe illness. Post operative complications may also increase these requirements. Much of the current literature recommends that patients should have an intake of at least 30 kcal/kg/day, whilst monitoring their weight closely and adjusting intake as required. This is in order to support wound healing and prevent weight loss. Intake consists of a high protein provision of between 1.25–1.5 g/kg, to prevent protein energy malnutrition and muscle wasting. Studies have also looked into the composition of enteral feeds, focusing on content such as immunonutrition. Immunonutrition is where the enteral feed or oral supplement is formulated to contain nutrients (such as glutamine and arginine), which support the immune system and reduce infections. The European Society of Parenteral and Enteral Nutrition (ESPEN) Guidelines on Enteral Nutrition advises using these formulas for a 5–7 day period following surgery. However other studies have advised a longer period of 7–10 days or more.

The key recommendations however are that

1. the enteral or oral nutrition support should be commenced within 24 h following surgery.
2. should be prescribed on an individual basis.
3. Assessment is carried out by the specialist Dietitian. Clinical recommendations should be followed by the team.

5.2 Enteral Nutrition

Enteral feeding refers to the delivery of nutritionally complete food (containing protein, carbohydrate, fat, water, minerals and vitamins), directly into the stomach, duodenum or jejunum. If a patient cannot swallow, but their gut is otherwise working normally this is the preferred choice of feeding. The obstruction is bypassed by one of several techniques.

5.2.1 Gastrostomy Feeding

A gastrostomy is an artificial opening, passing through the abdominal wall into the stomach, through which a feeding tube can be passed.

Methods of placement:

- Surgical
- Endoscopic (PEG)—push, pull and stab technique
- Radiologically guided gastrostomy (RIG)
- PEG with jejunostomy extension (PEG-J)

5.2.2 Care and Use of Gastrostomy Tubes

The duration of a gastrostomy tube is dependent on the type being placed and the method of placement. Companies that produce gastrostomy tubes often provide guidance on how often a tube should be changed. However if the tube is not working properly this may need to be replaced sooner. Good care of the tube and stoma site are key to ensuring longer tube life.

5.2.3 Providing Medications via a Gastrostomy Tube

All medications which are to be administered through a gastrostomy tube should be in liquid, dissolvable or crushable form. This needs to be agreed with the medical team or pharmacist since some drugs are coated to ensure they are absorbed in the correct way. If they are not designed to be crushed or dissolved they may no longer be absorbed predictably and this may result in incorrect dosage or unwanted interactions.

In order to provide medications via the tube the following method should be used:

- If you are using a pump put it on hold.
- Flush the tube with water using a syringe.
- Dissolve, crush, or mix the medication with water as necessary. Draw this into the correct syringe and flush down the gastrostomy tube.

4. Flush your feeding tube again with at least 60 ml of water and restart feeding.
5. Restart pump feed at correct time

NB: Some medications may interact with the enteral feed. There may need to be a rest period from feeding before and after administration of the medication. Your pharmacist or Dietitian will guide you with this.

5.2.4 Cleaning the Stoma Site

When carrying out the cleaning of a stoma site the following steps are crucial:

- Wash your hands with soap and water and dry well before touching your patients tube site.

- Move the external fixation plate up the tube (away from the patients stoma) to gain sufficient access for cleaning.
- Clean around the tube with mild soap and warm water daily or saline water if cleaning is taking place within the first 10 days following placement.
- Dry thoroughly using gauze or non-fibrous materials. Do not use cotton wool or gauze which has been cut.
- Do not put a dressing under the fixation plate unless advised to do so by the specialist gastrostomy nurse. This can put too much pressure on the site below the fixator disc.
- Do not use powders or creams unless these have been prescribed for the patient by the medical team.
- Contact your specialist nutrition nurse or gastrostomy team for stoma site review if there is a problem with:
  - The tube site is red or sore
  - There is leaking from around the tube
  - The tube is too loose or tight
  - There is any sign of over granulation
  - There is significant discomfort or pain when cleaning

5.2.5 Feeding via the Gastrostomy Tube

The method of feeding via a gastrostomy tube may depend on several aspects of the patient's overall treatment pathway. Dieticians prescribe the correct enteral feeding regimen for the patient, taking into consideration drug-nutrient interactions, patient choice, medical state, nutritional requirements and the local environment at the time of feeding.

Patients may be set up with pump feeding, which runs continuously over a number of hours at a predetermined rate and total volume. This however does not suit every patient and if necessary the patient can be changed to bolus feeding. Bolus feeding is administration of nutritional feed by syringes intermittently throughout the 24 h period.

Alternatively if tolerance to feeding is poor the patient may be advised to carry out gravity feeding where feed is allowed to flow naturally from a bottle. This prevents large volumes being administered at high pressure and often helps with tolerance issues.

Your Dietitian will guide you as to which regimen is most appropriate for your patient.

5.2.6 Constipation or Diarrhoea

- When tube feeding is started it can lead to more or less frequent bowel movements than normal. This should settle down as the body adjusts to the feed.

- If the patient has persistent diarrhoea you must first take a stool sample and test it for infection. Then contact your local Dietitian for advice.
- Constipation is often a side effect of high dose pain relief, notably opiates. Patients may therefore respond better to changes in medications or inclusion of laxatives, rather than adjustments of the feed formulation.

5.2.7 Nausea

If the patient is complaining of nausea try the following:

- Temporarily stop feeding and sit the patient in an upright position. If they no longer feel nauseous after 1 h, try a flush of water down the tube and assess symptoms.
- When restarting your feed, make sure the patient remains in an upright position or if in bed, that the head is raised at 30-45°.
- Re-start the feed at a slower flow rate than normal. Gradually increase the feeding rate back to the goal rate. If the symptoms persist contact the Dietitian or community nurse for feed review.
- If the patient has a Nasogastric tube, always re-check the position after vomiting using pH paper (or according to local policy).

5.3 Common Problems with Gastrostomy Tubes

5.3.1 Tube Blockage

If the tube blocks, try the following:

- Firstly check to ensure all clamps are opened.
- Use 10 ml syringe and fill it up with 5 ml water. Use gentle push and pull motion on the plunger of the syringe to dissolve the blockage. Sometimes messaging the tube with fingertips may help.
- Alternatively try the use of warm water in the syringe to flush.
- If this does not work there are medications which are licensed to unblock tubes (such as bicarbonate of soda and a small dose of Creon). However these must be advised by the specialist nurse or Dietitian.
- After unblocking, flush the tube with cooled, boiled water.
- Never try to unblock the tube with sharp objects or excessive force.

If at first you do not succeed, try once more. If tube blockage persists contact your community nurse or dietitian. If you are unable to unblock the tube you may need to request a replacement tube.

5.3.2 Tube Breakage

Depending on at which point the tube breaks it may need to be replaced or can be fixed at the patient's bedside. You will need to contact your local specialist nurse in order to carry out this assessment. It may need to be replaced and so quick referral to the specialist team is essential.

5.3.3 Tube Falls Out

The stoma site can close up in a matter of minutes. Therefore if a tube falls out you need to contact your endoscopy team or specialist gastrostomy nurse or Dietitian urgently for advice.

5.4 Nasogastric Tube Feeding (NGT)

Patients who have undergone complex surgery to the oral cavity may remain nil by mouth for a period of time to allow for wound healing. Since this is only a temporary problem, a nasogastric feeding tube passed into the GI tract is a simple reversible solution. This can be passed in theatre or on the ward.

Patients who undergo surgery which does not affect the oral cavity are unlikely to require NGT feeding. Patients who require NGT therefore include those who have tracheostomies, free flap reconstructions, prolonged IMF and /or have dysphagia following surgery. A patient on NG feeding will typically have feed from 3–10 days before the medical team advised they are safe for swallow assessment.

If a patient is due to have radiotherapy following surgery they may have a gastrostomy tube inserted during the initial surgery instead of a nasogastric tube. This is often due to the anticipated side effects of chemotherapy-radiotherapy, which can result in severe inflammation in the mouth (mucositis). In these patients long term enteral feeding being required. Others may start with a nasogastric tube and progress to gastrostomy placement once a decision on radiotherapy had been made.

Tonsillectomy patients are encouraged to eat and drink immediately post operation as this encourages healing to this type of wound. Patients who undergo orthognathic surgery, or fracture repair to the jaws rarely require alternative feeding. However, heavy chewing must be avoided for a few weeks, so an oral textured diet (see modified textured diet section) may help.

5.4.1 Care and Use of Nasogastric Feeding Tubes

The specific feeding regimen for nasogastric feeding will be provided by the specialist Dietitian. They will have formulated a regimen taking into consideration the

patients nutritional requirements and their medical state at each stage of the treatment pathway.

This tube is placed through the nostril and ends in the stomach. There is nothing to hold it in place internally so the position of the tube tip can move. It is often fixed to the nostril with tape or a clip to reduce the risk of it falling out. However this doesn't prevent the tip of the tube becoming dislodged nor does it prevent the patient removing the tube themselves.

Do not advance or rotate the tube unless trained to place nasogastric tubes. Ideally tape the tube to the patients' face where it exits the nostril to reduce movement.

Prior to any administration of liquids into the feeding tube the position must be confirmed. This is often done with a chest x-ray, taken immediately after insertion, while the guide wire is still present. Do not remove the guidewire until this has been done. Otherwise the tube will not be visible on the Xray. Supplemental checks are also often undertaken, such as using gastric aspirates. To check tube position using pH paper, attach the designated enteral feeding syringe (these are all purple in colour) and draw back a small volume of liquid. Test this liquid with pH paper and confirm that the pH is 5 or below as per the National Patient Safety Agency guidelines. The pH should be checked prior to any of the following:

- Before giving feed and medications
- At least once a day during continuous feeds
- Following vomiting, retching or coughing
- When signs of tube displacement (e.g. visible tube appears longer).

It is also important to check the external length of the tube when initially placed and document this clearly in the medical notes or bed chart.

If you are unable to obtain fluid for a pH reading, try the following:

- Wait half an hour then try again
- Lie the patient on their right hand side for 15 min then try again
- Insert 5 ml of air then try again
- If the patient is also able to eat and drink try asking them to drink a coloured drink (i.e. juice or squash) then aspirate back and if the liquid is the same as they have just drank, the tube is in your stomach.
- Compare the initially documented external measure of the NGT placement to see if the NGT has not been dislodged.

Do not use the tube and request a new placement if you are still unable to get an aspirate are getting pH of above five feel the tube has moved you will need to have the tube replaced.

Do not use the tube unless you know it is in the correct position.

5.5 Tracheo-oesophageous Puncture Feeding Tube (TOFT)

This is a fine bore feeding tube inserted through trachea (stoma), through a tracheo-oesophageus puncture (TOP), into the oesophagus and passed down into the stomach. With regards to feeding this tube is used in the same way as a nasogastric tube. The dietitians will prescribe the appropriate feed for use down the tube.

With these tubes there is no communication between the oesophagus and trachea. Therefore patients are anatomically not at risk of aspirations.

The types of patients who are most likely to have a TOFT are post laryngectomy patients due to the change in anatomy.

If a TOFT is not possible, the patient will have an alternative source of nutrition such as a NG/PEG.

For patients without a Tracheo-oesophageal puncture there is no hole for oral intake to go through and thus no risk of aspiration. These patients would be fed via an oral diet or alternative gastric tube the same as non laryngectomy patients however there would be no risk of aspiration.

5.6 Post Enteral Feeding (Weaning)

Not all patients need lifelong feeding through a tube. Many will need to be weaned off this, back to normal eating. Once the medical team are happy for a swallow assessment to be undertaken, the specialist Speech and Language Therapist will complete a swallow assessment and advise on the patients safe oral intake.

During this period of reintroducing oral intake it is common practice to adjust the NG feeding regimen to overnight only in order to encourage appetite during the day and reduce the number of kcal/protein that the patient receives. The dietitians will guide you on the volume and rate to provide this at.

5.6.1 Texture Modified Diet and Food Fortification

When reintroducing oral diet it is important that patients receive high energy dense foods such as those made with full fat products and high protein options. It is important to carry out food fortification by adding full fat butter, cream and cheese to increase the energy density of the foods, especially if they are only managing small amounts. Eating little and often (e.g. 5–6 smaller meals and snacks) may be easier than three large meals a day if your patient is finding their appetite is poor or they have increased fatigue when eating.

The texture of the patients diet will be advised by the speech and language team or by the dietitian. In regards to the texture of the food the National Patient Safety Agency guidelines state the following:

Term used national descriptor	Examples
Normal diet	
Food doesn't need modifying.	Free choice of food (unless otherwise advised).
Soft diet (E)	
Dishes consisting of soft, moist, bite-sized pieces. Can be a mixture of solids and liquids. *Avoid* foods which are easy to choke on: • dry/crisp—crisps/muesli/battered or breaded food, biscuits/toast/pie crusts • sticky—white bread/peanut butter/toffee • stringy—fruit skins/peas/beans/sweetcorn/cabbage • chewy—crusts on bread	Sandwiches with soft fillings and no crust (e.g. cream cheese, tuna or egg mayo, thin meat, salmon, jam). Casserole, beef hotpot, savoury mince, corned beef hash, Fisherman's pie, cottage pie, shepherd's pie, cheese and potato pie. Fish (e.g. flaked/steamed/poached with sauce, or boneless fish cake). Egg (e.g. omelette, scrambled). Moist pasta dishes (e.g. macaroni cheese, ravioli) Soft boiled veg, fresh thinly sliced fruit (without skin). Sponge and custard, yoghurts, some chocolates (e.g. soft centres, milky way etc).
Fork-mashable diet (D)	
Food that breaks up easily with a fork into small, soft, easy to chew, moist pieces. Doesn't need pureeing or sieving. Served with a thick sauce/gravy. Meat should be soft, moist and minced *after cooking*. *Avoid* foods which are easy to choke on: • dry/crisp—as above • sticky—as above • stringy—as above • chewy—as above	Weetabix in milk, porridge. Cottage pie, fish pie, skinless sausages in thick gravy, minced chicken/turkey in white sauce, flaked fish in sauce. Egg (e.g. egg mayo, top of quiche, scrambled egg). Well-cooked pasta dishes (e.g. macaroni cheese). Soft veg dishes (e.g. cauliflower cheese, tinned tomatoes, mashed root veg in gravy). Soft fruit (e.g. mashed banana, avocado, stewed apples, tinned peaches, soft pears). Soft puddings (e.g. yoghurts, angel delight, crème caramel, cheesecake top, semolina, sponge mashed with custard, fruit crumbles).
Pureed diet (B + C)	
A thick, smooth, uniform consistency without lumps. Food shouldn't separate into liquid and solid—thickener may need to be added. Food pureed in a blender with liquid added as required. *Avoid* foods which are difficult to blend: • rice and pasta • battered/breaded foods • raw veg/foods with skins and husks • foods with seeds	Weetabix in milk, porridge. Creamy soup. Pureed meats/veg/fruit. Blended tinned spaghetti. Mashed banana/stewed apple. Mousse/fromage frais/crème caramel/yoghurt/whipped cream/thick custard/ground rice. *Plus nutritional boosting (from dietetics)*
Liquidized diet (A)	
A smooth pouring consistency without lumps (food has been pureed and sieved, extra liquid and thickener may need to be added).	Blended meals (with liquid added as required). Creamy soups. Milkshake, thin custard. *Plus nutritional boosting (from dietetics*)

Term used national descriptor	Consistency to aim for	Examples	Approximate amount of Thick'n'Easy thickener needed
Normal fluids (thin fluids)			
Thickener is not required.	Water Tea/coffee Squash	Water/Squash Tea Coffee without milk	None
Syrup			
A thickener may need to be added. A plastic spoon will fall freely through the liquid. Can be sipped from a cup or through a straw	Syrup from tinned peaches Coffee made with full cream milk	Syrupy fruit juices Thick hot chocolate Full cream milk Cream liqueurs Complan Build-up (made to instructions) Ensure (milky or fruit-flavoured) Chocolate fortisip Tesco 'thick shake' YOP Smooth milkshake	1 blue scoop 1 ½ teaspoons
Single cream (Stage 1)			
A thickener will need to be added to normal fluids. A plastic spoon will move easily through the liquid. Can be sipped from a cup or through a straw.	Single cream	Yoghurt drinks Tomato juice Melted ice-cream Boots fruit/yoghurt smoothies Mars milkshake Frijj milkshake Build-up tomato soup	1 ½ blue scoops 2 ½ tsps
Double cream (Stage 2)			
A thickener will need to be added to normal fluids. Fluid is slow moving off a spoon. Can be sipped from a cup but not through a straw.	Double cream (before whipping)	Some smoothies Pouring custard Smooth yoghurt (not set) Morrisons yoghurt smoothie (vanilla and honey) Ski smooth yoghurt drink	2 blue scoops 3 tsps
Thick paste (Stage 3)			
A thickener will need to be added. A plastic spoon will stand on its own in this liquid. Cannot be sipped from a cup or poured—needs a spoon.	Thick paste/ yoghurt.	Thick custard Whipped cream Semolina Pudding	2 ½ blue scoops 4 tsps

5.6.2 Fluids

It is important to ensure your patients have enough fluids in order to maintain hydration. This should be a minimum of 1500–2000 mls per day. This may be difficult when patients have restricted swallowing and are requiring thickened fluids. It is important therefore to maintain strict fluid balance charts on these patients to ensure close monitoring.

If they are only managing small amounts of food orally, nourishing drinks or soups can be an essential part of their nutritional intake and are an easy way of providing fluid as well as energy and protein. They can be homemade drinks and soups which are fortified with coconut milk, condensed milk, evaporated milk, honey, cream, cheese, soured cream or milk powder to make them more nourishing. Alternatively they could be prescription supplements such as Ensure plus, Fresubin energy, Nutrison energy. The most appropriate supplements will be chosen and prescribed by the Dietitian looking after the patients.

5.7 Referral to Dietitian

Patients undergoing surgery to the Head and Neck area are likely to require significant nutritional support. It is therefore important that you familiarise yourself with your local hospitals policies and guidance on referrals to the Nutrition and Dietetic Services.