

Scottish Intercollegiate Guidelines Network



Management of patients with stroke: Identification and management of dysphagia

A national clinical guideline



1	Introduction	1
2	Initial clinical evaluation of swallowing and nutrition after stroke	3
3	Assessment	7
4	Training for screening and assessments	9
5	Nutritional interventions	11
6	Other management issues	14
7	Patient issues	17
8	Implementation, audit and further research	20
9	Development of the guideline	22
	Annexes	25
	References	36

September 2004

KEY TO EVIDENCE STATEMENTS AND GRADES OF RECOMMENDATIONS

LEVELS OF EVIDENCE

1 ⁺⁺	High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias
1 ⁺	Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1 ⁻	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2 ⁺⁺	High quality systematic reviews of case control or cohort studies High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2 ⁺	Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2 ⁻	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	Non-analytic studies, eg case reports, case series
4	Expert opinion

GRADES OF RECOMMENDATION

Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

A	At least one meta-analysis, systematic review of RCTs, or RCT rated as 1 ⁺⁺ and directly applicable to the target population; <i>or</i> A body of evidence consisting principally of studies rated as 1 ⁺ , directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2 ⁺⁺ , directly applicable to the target population, and demonstrating overall consistency of results; <i>or</i> Extrapolated evidence from studies rated as 1 ⁺⁺ or 1 ⁺
C	A body of evidence including studies rated as 2 ⁺ , directly applicable to the target population and demonstrating overall consistency of results; <i>or</i> Extrapolated evidence from studies rated as 2 ⁺⁺
D	Evidence level 3 or 4; <i>or</i> Extrapolated evidence from studies rated as 2 ⁺

GOOD PRACTICE POINTS

<input checked="" type="checkbox"/>	Recommended best practice based on the clinical experience of the guideline development group
-------------------------------------	---

© Scottish Intercollegiate Guidelines Network

ISBN 1 899893 98 9

First published 2004

SIGN consents to the photocopying of this guideline for the purpose of implementation in NHSScotland

Scottish Intercollegiate Guidelines Network

Royal College of Physicians

9 Queen Street, Edinburgh EH2 1JQ

www.sign.ac.uk

1 Introduction

1.1 DEFINITIONS

The World Health Organisation defines stroke as “a clinical syndrome of rapidly developed clinical signs of focal or global disturbance of cerebral function, lasting more than 24 hours or leading to death with no apparent cause other than vascular origin.”¹

Dysphagia, a difficulty in swallowing, can be caused by many pathologies including stroke. In patients with stroke, it is characterised by difficulty in safely moving food or liquids from the mouth to the stomach without aspiration. It may also involve difficulty in oral preparation for the swallow, such as chewing and tongue movement.

1.2 THE NEED FOR A GUIDELINE

Dysphagia is a frequent and potentially serious complication of stroke,² and in some cases may be the sole or overriding symptom.³⁻⁶ Reports of incidence vary according to the definition of dysphagia and the timing and method of assessment. Videofluoroscopic evidence indicates the presence of dysphagia in 64-90% of conscious stroke patients in the acute phase, with aspiration confirmed in 22-42% of cases.⁷⁻⁹

Dysphagia is associated with excess morbidity and increased mortality rates. It gives rise to a risk of aspiration and associated bronchopulmonary infections, fluid depletion and undernutrition.¹⁰⁻¹⁴ Whilst it is recognised that the development of undernutrition is multifactorial, nutritional problems may be exacerbated by decreased swallow function following stroke. Patients with acute stroke who are undernourished may take significantly longer to recover and have a higher mortality than those who are well nourished.^{15,16}

Most dysphagia resolves within the first few weeks,^{2,10,12-14,17} but in some cases it may persist^{2,7,18} with resulting long term consequences for nutrition management and psychosocial adjustment.

Implementation of a systematic programme of diagnosis and management of dysphagia within an acute stroke management plan can reduce the occurrence of pneumonia.¹⁹

Despite this evidence, the detection and management of swallowing problems in acute stroke is inadequate in many hospitals.²⁰ The aim of this guideline is to assist practitioners in reducing the morbidity associated with dysphagia by early detection of swallowing disorders in stroke patients and application of appropriate methods to support food and fluid intake.

Although much has been written on the subject, there is a paucity of good, high level evidence to support the management of this aspect of stroke. There is an ongoing need for healthcare professionals to evaluate their practice in relation to outcomes and to consider carrying out audit and research in the field.

1.3 POPULATION COVERED BY THE GUIDELINE

The guideline is relevant to all personnel in contact with stroke patients throughout the care pathway from initial primary care response, through hospital admission, on to continuing care in the community. As the evidence base is strongest for patients in the acute setting, the emphasis is on this context.

The guideline does not apply to people with neurological conditions other than stroke, or to people with subarachnoid haemorrhage.

1.4 THE SIGN STROKE GUIDELINES SERIES

Four SIGN stroke guidelines have been published:

- Management of patients with stroke part I: Assessment, investigation, immediate management and secondary prevention ²¹
- Management of patients with stroke part II: Management of carotid stenosis and carotid endarterectomy ²²
- Management of patients with stroke part III: Identification and management of dysphagia ²³
- Management of patients with stroke part IV: Rehabilitation, prevention and management of complications, and discharge planning.²⁴

This guideline is a complete revision of part III and supersedes it. A revised part IV was published in November 2002.²⁵ Parts I and II are being reviewed jointly and a single publication is expected in 2006.

1.5 STATEMENT OF INTENT

This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement regarding a particular clinical procedure or management plan must be made by the appropriate healthcare professional(s), following discussion of the options with the patient, in light of the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

1.6 REVIEW AND UPDATING

This guideline was issued in 2004 and will be considered for review as new evidence becomes available. Any updates to the guideline in the interim period will be noted on the SIGN website: www.sign.ac.uk

2 Initial clinical evaluation of swallowing and nutrition after stroke

Dysphagia affects a large proportion of stroke patients. Swallowing difficulties can result in aspiration and reduced oral intake. These in turn can lead to the potentially serious complications of pneumonia, undernutrition and dehydration. As these complications may be avoidable or reversible, it is important to screen all stroke patients in order to identify those individuals at risk.^{19,26,27}

2++
4

C All stroke patients should be screened for dysphagia before being given food or drink.

2.1 ASSESSING RISK OF PNEUMONIA

The presence of dysphagia indicates an increased risk of lower respiratory tract infection.²⁶ Confirmed aspiration has been found to increase the risk of pneumonia by some,^{12,28} although others have found no such link.¹¹ The aspiration of solid material or thickened fluids leads to an increased risk of developing pneumonia.²⁸⁻³⁰ A prolonged pharyngeal transit time is also associated with increased risk of aspiration pneumonia.³¹

2+
3
4

Pneumonia does not always occur in the presence of aspiration and may occur in the absence of aspiration, as a consequence of other factors present in the stroke patient (eg smoking, respiratory disease, immobility or comorbidity).³²⁻³⁵

2+

The relationship between aspiration and pneumonia is complex, but aspiration is a risk factor and must be identified as a priority.

2.1.1 ASPIRATION RISK

Coughing is a sign of material penetrating the airway, but the absence of cough does not indicate safe swallowing; up to 68% of patients seen to aspirate on videofluoroscopy fail to cough.²⁶

2++

Risk of aspiration is suggested by the following:^{36,37}

- wet, hoarse voice
- weak voluntary cough
- any indication of reduced laryngeal function.

2+
2-

Reduced conscious level is also an indicator of aspiration risk.³⁷

The gag reflex is unreliable and insensitive as an independent predictor²⁶ and should only be used as part of a more detailed assessment procedure (see section 3).³⁸

2++

One screening study suggests that reduced pharyngeal sensation may be associated with aspiration,⁹ although other papers report conflicting results.³⁹ Testing of pharyngeal sensation in stroke patients may be useful in predicting aspiration, but there is currently insufficient evidence to recommend its use as a screening tool.

3

Laryngopharyngeal sensory testing has also been described but insufficient evidence was identified to recommend it.⁴⁰

A water swallow test is often used to identify aspiration risk. The patient is given teaspoonfuls of water and the initiation of the swallow and any occurrence of coughing or alteration in voice quality are observed (see Annex 1). If there are no adverse signs, the patient is given a larger quantity to drink from a glass. This test has a reported sensitivity of > 70% and a specificity of 22-66% for prediction of aspiration²⁶ and has been found to be a useful and reasonably sensitive screening test.^{17,41}

2++

B The water swallow test should be used as a part of the screening for aspiration risk in stroke patients.

2.1.2 OTHER RISK FACTORS

Dysphagia in conjunction with pulmonary compromise (eg chronic obstructive pulmonary disease, smoking or cough that does not clear the chest adequately) may increase the risk of pneumonia.^{27,33,42}

Requiring help with eating has been shown to be a significant risk factor in the development of aspiration pneumonia in elderly patients.³³ 2+

Dental decay, the presence of cariogenic bacteria and other oral pathogens may be important risk factors for aspiration pneumonia in elderly patients.^{33,43}

C Clinical history taking should take into account comorbidities and other risk factors (eg smoking or respiratory disease) to identify increased risk of developing aspiration pneumonia.

Medications for pre-existing conditions that list dysphagia as a potential side effect should be excluded (eg bisphosphonate and potassium supplements, refer to the manufacturer’s recommendations).

2.2 SWALLOW SCREENING

In clinical practice, the screening process is used to identify those patients who should be referred for full clinical assessment by a professional skilled in the management of dysphagia (usually a speech and language therapist; SLT). If the screening procedure does not identify any difficulties, the patient can be allowed to eat and drink, avoiding unnecessary restrictions on oral intake while awaiting a full clinical assessment.

Screening tests are based on identified risk factors and should be carried out by healthcare professionals trained in the procedure. In the acute setting, this is usually a trained nurse.

Studies assessing the natural history of swallowing function after acute stroke suggest that many patients with dysphagia recover their swallowing within the first week^{2,12-14} and the majority will have improved by the end of the second week.^{10,12} 3 4

D Patients with dysphagia should be monitored daily in the first week to identify rapid recovery. Observations should be recorded as part of the care plan.

Patients not fit for assessment should be screened daily to avoid delay in referral for full clinical assessment.

2.2.1 SWALLOW SCREENING PROCEDURES

A number of similar screening procedures are described in the literature. All rely on a small range of clinical features, designed to highlight swallowing dysfunction.²⁶ An example swallow screening procedure is shown in Annex 1. 2++

B A typical swallow screening procedure should include:

- initial observations of the patient’s consciousness level
- observations of the degree of postural control.

If the patient is able to actively cooperate and is able to be supported in an upright position the procedure should also include:

- observations of oral hygiene
- observations of control of oral secretions
- if appropriate, a water swallow test.

Screening protocols must include a clear pathway of action for all possible outcomes (eg onward referral, nil by mouth, commence oral diet).

- Patients who are nil by mouth or are on a modified diet should continue to receive clinically essential medication by an appropriate route as advised by a pharmacist.

2.3 ASSESSING RISK OF UNDERNUTRITION

Observational studies have determined that between 16–49% of stroke patients, with or without dysphagia, are undernourished on admission to hospital.⁴⁴⁻⁴⁶ In addition, dysphagia in itself is associated with undernutrition.²⁶

The predictors of undernutrition on admission to stroke rehabilitation are:⁴⁴

- the use of tube feeding
- a prior stroke
- diabetes mellitus.

2⁺⁺
2⁺

The predictors of undernutrition at one week post stroke are:⁴⁴⁻⁴⁶

- pre-existing undernutrition
- swallowing problems
- increased free urinary cortisol.

Low serum albumin levels on admission show a significant association with poor outcome.¹⁶

- Early and sequential screening for nutritional risk is needed to permit appropriate nutritional intervention.

2.4 NUTRITIONAL SCREENING

Nutritional screening is a simple and rapid procedure that identifies clinical characteristics known to be associated with a reduction in nutritional status. The results of the screening process should direct any further action required, eg referral to a dietitian for a comprehensive nutritional assessment, or the recording of food and fluid intake. Early and regular screening of stroke patients for undernutrition is important.⁴⁷⁻⁴⁹

4

D Patients' nutritional risk should be established using a valid and reliable screening procedure suitable for stroke patients. Nutritional screening should be repeated at regular interval throughout the episode of care.

D Nutritional screening should focus on the effects of the stroke on nutritional status (eg presence of dysphagia and ability to eat) rather than previous nutritional status.

D Nutritional risk should be established within 48 hours of admission to hospital.

D Results from the nutritional screening process should guide appropriate referral to a dietitian for assessment and management.

2.4.1 NUTRITIONAL SCREENING PROCEDURES

The following screening parameters have been suggested by the Nursing and Midwifery Practice Development Unit (2002)⁴⁹ as suitable for the care of adults in hospital:

4

D Nutritional screening should cover:

- body mass index (*BMI*)
- ability to eat
- appetite
- physical condition
- mental condition.

Although many screening tools use BMI as a criterion to assess undernutrition, a recent review concluded that weight and weight change were more sensitive and more dynamic screening parameters than BMI in older people.⁵⁰ Weighing and measuring stroke patients may present some practical problems, as specialist equipment and training may be required.

The Malnutrition Universal Screening Tool (MUST), launched in 2004, has been endorsed by the British Dietetic Association, The Royal College of Nursing and the Registered Nursing Home Association. Further information is available at www.bapen.org.uk

2.5 ASSESSING RISK OF DEHYDRATION

Dysphagia is associated with dehydration but no evidence on the clinical predictors of dehydration was identified.^{10,13,51} There is no evidence of a clear relationship between radiological aspiration and oral dehydration.^{11,30}

4

3 Assessment

Assessments by trained personnel typically use a range of fluid and solid textures to define the physiological dysfunction, identify the need for further investigation, test the effectiveness of selected treatments and enable the development of a management plan.

3.1 CLINICAL BEDSIDE ASSESSMENT

Two systematic reviews have assessed the sensitivity and specificity of the clinical bedside assessment (CBA) of oropharyngeal swallowing.^{26,27} The definition of CBA varies between studies.^{37,38,52-56} There is a need for research on a standardised CBA tool to allow direct comparison and aggregation of data.

2⁺⁺
2⁺

B A standardised clinical bedside assessment (CBA) should be used by a professional skilled in the management of dysphagia (currently speech and language therapists).

The CBA developed by Logemann contains 28 items (see Annex 2)³⁸ and has been tested for inter- and intra-rater reliability.

2⁺

Grouping of some items increases sensitivity and specificity for the identification of oral stage swallowing problem, aspiration, pharyngeal delay and pharyngeal stage swallowing disorder.³⁸

B The CBA developed and tested by Logemann, or a similar tool, is recommended.

3.2 INSTRUMENTAL ASSESSMENT

The CBA can also be used to determine the need for, and appropriateness of, additional instrumental assessment.⁵⁷ The limitations of clinical testing, eg poor detection of silent aspiration⁵² and poor information on the efficacy of an intervention, mean that a reliable, timely and cost effective instrumental swallow evaluation should be available for all patients following acute stroke.⁵⁸

3.2.1 MODIFIED BARIUM SWALLOW

The modified barium swallow (MBS) is a dynamic assessment of the oral, pharyngeal and upper oesophageal phases of swallowing using videofluoroscopy.⁵⁹ It provides a comprehensive instrumental assessment of swallowing, determining not only whether the patient is aspirating but also why. MBS allows for experimentation with dietary textures, postures and manoeuvres hypothesised to improve the safety and efficiency of the swallow.⁶⁰

MBS is regarded as the “gold standard” in the assessment of dysphagia, both diagnostically and therapeutically. It is difficult to assess MBS in the absence of an investigation with equivalent credibility. There is limited standardisation among centres and the reliability of reporting is variable. Inter- and intra-agreement varies between 66 and 98%.²⁶

2⁺

Although absence of aspiration observed on MBS may be a reliable observation, there is conflicting evidence regarding the clinical significance of aspiration observed on MBS.⁶¹ Some papers demonstrate a link between aspiration and lower respiratory tract infection, and other parameters, such as prolonged hospital stay and increased disability. One investigation has demonstrated no association with aspiration on MBS.¹¹

2⁺

Other cited limitations of MBS include potential difficulty in transporting stroke patients to a radiology department, exposure to radiation and the limitations of basing management recommendations on a “snapshot” view of swallowing function.

3.2.2 FIBRE OPTIC ENDOSCOPIC EVALUATION OF SWALLOW

Fibre optic endoscopic evaluation of swallowing (FEES) is an assessment of swallowing using a flexible nasendoscope, which is passed into the nares, over the velum and into the pharynx.

Two well conducted studies support the value of FEES as an inexpensive, portable and reliable alternative to the MBS.^{62,63} No anaesthesia was used in either of these studies prior to passing the endoscope. FEES has been shown to be as effective as MBS in detecting laryngeal penetration, aspiration and residue. Sensitivity and specificity are best for penetration (100% and 75%) and aspiration (88% and 92%). In addition, FEES is a valuable tool for observing bolus movement through the hypopharynx and gauging the success of airway protection manoeuvres.⁶³ FEES cannot be used to assess oral stage of swallowing disorders or determine bolus movement at the point of swallowing.

There is some evidence, in a neurological dysphagia-specific group (not all stroke patients), that patient outcome with respect to development of pneumonia is essentially the same whether dietary and behavioural management are guided by the results of MBS or FEES.⁶²

2+

C The modified barium swallow test and fibre optic endoscopic evaluation of swallow are both valid methods for assessing dysphagia. The clinician should consider which is the most appropriate for different patients in different settings.

3.3 OTHER ASSESSMENTS

3.3.1 CERVICAL AUSCULTATION

Cervical auscultation (CA) involves placing a stethoscope on the lateral aspect of the larynx and listening to the airflow during normal breathing and swallowing.

There is no consistent evidence to support the usefulness of CA in the assessment of dysphagia. One study with a limited stroke population suggests that the addition of CA does not improve the accuracy of the CBA when assessing pharyngeal delay and residue.⁶⁴ When raters are experienced, however, good agreement can be achieved in the detection of aspiration when comparing CA with CBA and MBS although it should be noted that these assessments were not conducted simultaneously.⁶⁴

One study has shown that speech and language therapists cannot reliably detect aspiration when listening to swallow sounds in isolation in a mixed group of patients.⁶⁵

There is insufficient evidence to recommend CA for evaluating risk of aspiration and pharyngeal stage dysphagia. Further research is required as to the added value of CA to the CBA, given that it is an inexpensive and readily available test that presents no direct risk to patients.

3

3.3.2 PULSE OXIMETRY

There are several studies assessing the relationship between changes in oxygen saturation (measured in arterial blood flow by pulse oximetry) and aspiration. The results are conflicting and demonstrate that some stroke patients become hypoxic and in some, this coincides with eating and drinking. The weight of evidence would suggest that pulse oximetry registers a complex series of events in relation to swallow function.⁶⁶⁻⁷³

One study demonstrates falls in oxygen saturation of 2% and 4% in 52% and 14%, respectively, of normal elderly people with no complaint of dysphagia.⁷⁴

Changes in oxygen saturation can occur for a variety of reasons and cannot at this stage be related to the presence of dysphagia or aspiration. The use of pulse oximetry should be investigated further.

2+
3

4 Training for screening and assessments

4.1 SCREENING

Little evidence is available on the training required to become competent in dysphagia screening with water swallow tests. One simple reliability study suggests that inter-rater agreement on a standardised swallowing assessment is better amongst assessors who have received full training, including both theoretical and practical input.⁷⁵ 3

It is generally agreed that nurses play a vital role in the early identification of swallowing difficulties. One systematic review of descriptive studies recommends that nursing knowledge and practice should include: risk factors, early signs, observation of eating and drinking habits and monitoring weight, body mass index and hydration.⁷⁶ 4

Various training packages are available.⁷⁶ Evaluation of the effectiveness of training is largely informal but all evaluations report benefits of training in terms of knowledge, practical skills and confidence.^{77,78} Following nurse training, the rate of referral to SLTs was not reduced, but more of the referrals were appropriate.⁷⁹ 3
4

No single model for staff training emerges as better than any other but some training packages designed for use in specific NHS hospitals have been made available for wider use.^{80,81} 4

D A training package for nurses should include:

- risk factors for dysphagia
- early signs of dysphagia
- observation of eating and drinking habits
- water swallow test
- monitoring of hydration
- monitoring weight and nutritional risk.

4.2 ASSESSMENT

4.2.1 CLINICAL BEDSIDE ASSESSMENT

The Royal College of Speech and Language Therapists (RCSLT) provides guidelines for training and registration for professionals performing CBA and gives details of the knowledge and skills required.⁸² 4

4.2.2 MODIFIED BARIUM SWALLOW

Legislation in the UK requires all those conducting radiological assessments to be trained in radiation protection (IR(ME)R 2000).⁸³ 4

There is no stipulated level of training which would guarantee competency in the use of videofluoroscopy or image interpretation. Several inter-rater reliability studies have produced disappointing results and some authors have suggested the need for training using specific or standard criteria in order to improve interjudge reliability.^{61, 84-86} Some authors have addressed this by proposing clearly defined rating scales^{87,88} (see Annex 3). 3
4

The RCSLT provides guidelines based on expert consensus, for pre-and postregistration training in dysphagia and the use of invasive procedures.^{82,89} Specialist training is required before an SLT can carry out an MBS test. The knowledge and skills required are outlined in the RCSLT guidelines, but no specific model of training is recommended. 4

4.2.3 FIBRE OPTIC ENDOSCOPIC EVALUATION OF SWALLOW

The RCSLT guidelines and other expert opinion agree that fibre optic endoscopy should only be performed by suitably trained healthcare professionals.⁸⁹ Detailed course requirements are provided by RCSLT. 4

4.2.4 IMPACT OF TRAINING

The RCSLT recommends postregistration training for conducting instrumental assessments. Employers should be aware of this and be prepared to fund training and supervision as required.

- D** All staff involved in the detection and management of dysphagia should be trained according to the recommendations of the relevant professional body.
- D** Standard criteria should be established for the interpretation of the results of radiological and fibre optic assessments.

5 Nutritional interventions

5.1 ORAL NUTRITIONAL SUPPLEMENTATION

One randomised trial observing stroke patients with no swallowing problems showed that oral nutrition supplementation is an effective method of improving nutritional status and clinical outcome.⁹⁰ No trials that included patients with dysphagia secondary to stroke were identified.

1+

5.2 TUBE FEEDING

5.2.1 SELECTION OF NASOGASTRIC OR GASTROSTOMY FEEDING

There are two ways of delivering nutrition by tube to patients who cannot swallow adequately. A nasogastric tube can be passed or a gastrostomy can be created. Both approaches serve to deliver nutritionally complete liquid feeds and medicines directly into the stomach and each has its advantages and disadvantages.

Gastrostomy tubes can be placed surgically, radiologically or endoscopically. The identified evidence for patients with strokes focuses almost entirely on percutaneous endoscopic gastrostomy (PEG).

Nasogastric (NG) tubes are quickly and easily passed and the technique has low procedure related mortality. The tubes are less well tolerated than PEG tubes and need to be replaced frequently.⁹¹ The mean effective life span of NG tubes varies between 10-28 days depending on the type and material of the tube and manufacturers' recommendations.⁹²⁻⁹⁴

Clear evidence for nutritional benefit from NG feeding is lacking. There is some evidence that nutritional improvement is less than with PEG feeding; that patients receive less of the prescribed feed and that tubes require frequent replacement because of displacement or blockage.⁹¹

Although procedure related mortality is low, inadvertent placement into the lungs can be a problem, and if unrecognised has serious consequences. Oesophagitis and upper gastrointestinal ulceration may also occur.

1+
2+
2+
3+
4

PEG tubes are cosmetically more acceptable to patients, they are less irritating and in the absence of complications, will not require replacement for several months. PEG placement is an invasive procedure requiring sedation and endoscopy and has a number of potential complications.^{91,95,96} Minor complications, such as tube displacement, minor skin infection, tube obstruction and leakage are relatively common with a reported rate of 13-62%. Major complications, such as gastric haemorrhage, serious abdominal wall infection, peritonitis and gastric fistula are reported in between 3 –19% of patients. The procedure related mortality is 0 –2.5%.

Long term mortality following PEG placement is high, presumably reflecting the seriousness of the underlying stroke. Mortality rates at 30 days, 6 months and 12 months are in the range of 20%, 40% and 50% respectively.⁹⁵⁻⁹⁸

With both types of tube feeding gastric intolerance can occur and may limit adequate delivery of nutrition. Gastro-oesophageal reflux and aspiration are common and neither type of tube feeding reduces the risk of aspiration after stroke.⁹⁹

3

Although further research is required to assess the optimum method of feeding stroke patients, each method has advantages in different circumstances. A comparison of the two methods is given in Table 1. A flowchart for the assessment of a patient's suitability for a PEG tube is given in Annex 6.

Table 1: Comparison of Tube Feeding Methods

	NG feeding	PEG feeding
Insertion	Easy, quick	Invasive
Replacement	Often	Infrequent
Tube life	Up to 1 month	Several months
Patient acceptance	Poor	Good
Nutritional benefit	Uncertain	Some
Mortality reduction	None	Possible
Complications	+/-	+ +
Procedure related mortality	Very low	0-2.5%

5.2.2 TIMING OF FEEDING

Despite the lack of evidence to support NG feeding, many patients tolerate an NG tube well and will benefit from the administration of nutrition, fluid and medication, by this route, in the first few weeks of nutritional intervention.

- Patients with dysphagia who are unable to meet their nutritional requirements orally should be considered for initial NG feeding as soon as possible, within one week of onset. This decision should be made by the multidisciplinary team in consultation with the patient and their carers/family.

A prospective cohort study of patients with dysphagia following stroke suggests that early enteral feeding in undernourished patients is of benefit, although no time scale was given.⁴⁵ A similar study indicated that the decision to place a PEG should be based on impaired swallow and the need for enteral feeding for more than two weeks or the inability to tolerate NG feeding on at least two occasions.¹⁰⁰

 2⁺⁺
2⁺

One report suggests that those patients with significant dysphagia at 5-7 days are at high risk of nutritional deterioration and should be considered for early PEG, but low numbers of patients were included.¹⁰¹

3

D Patients in the early recovery phase should be reviewed weekly by the multidisciplinary team to ascertain if longer term (> 4 weeks) feeding is required.

B Feeding via percutaneous endoscopic gastrostomy (PEG) is the recommended feeding route for long term (> 4 weeks) enteral feeding. Patients requiring long term tube feeding should be reviewed regularly.

The FOOD (food or ordinary diet) trials are a family of three pragmatic, multicentre, international, randomised controlled trials which enrolled patients admitted to hospital with a recent stroke. The first trial addressed whether or not routine oral nutritional supplementation for hospitalised stroke patients improved their outcomes. Results from the trial do not support a policy of routine oral supplementation after stroke, at least not in a predominantly well nourished group of patients.

The remaining FOOD trials asked whether the timing and method of enteral tube feeding for dysphagic stroke patients influenced their outcomes. Data from the trials suggests that starting tube feeding early may reduce case fatality and that unless there are strong practical reasons why a PEG tube should be used, early tube feeding should be via an NG tube. The trials do not support a policy of early initiation of PEG feeding in dysphagic stroke patients. Further information about the trials can be found at www.dcn.ed.ac.uk/food

5.2.3 QUALITY OF LIFE AND ETHICAL ISSUES

The problems that may be encountered with tube feeding combined with the high mortality in enterally fed patients emphasise the importance of weighing carefully the risks and benefits for each patient. Failure to provide nutritional support for patients who have not met, or are unlikely to meet, their nutritional requirements for a long period of time (seven days or longer) has been considered unethical.¹⁰² In patients with poor life expectancy, however, there should be good indications for PEG placement as feeding may merely slow the rate of decline or prolong an imminent death.

There is no evidence that PEG feeding actually improves quality of life. One study showed that whilst patients were grateful for the nutrition provided by PEG feeding, they remained ambivalent about the process.¹⁰³

Survey evidence indicates that a high proportion of patients with PEG remain dependent on carers and highlights the social impact of PEG feeding.¹⁰⁴

Patients and carers may have unrealistic expectations of the benefits of PEG feeding⁹⁷ and should be counselled on the benefits and burdens of PEG feeding before the intervention takes place. Those patients and carers who cope best are those who feel well informed and supported.¹⁰³

- The decision to place a PEG should balance the risks and benefits and take into consideration individual patient needs. Patients should also be given the opportunity to decide whether they want to go ahead with a procedure.

D Patient's and carer's perceptions and expectations of PEG feeding should be taken into account and the benefits, risks and burden of care fully explained before initiating feeding.

3

6 Other management issues

6.1 EFFECT OF REGULAR REVIEW ON PATIENT OUTCOME

Routine nutritional monitoring and interventions (ie regular weighing, nutritional analysis, staff attention to swallowing, texture modified diets, and tube feeds) contribute to improvements in nutrition and ensure that dysphagia is not associated with undernutrition in patients surviving beyond one month.⁴⁴ After discharge from hospital, unintentional weight loss (> 6 kg in three months) and older age may also indicate nutritional risk in stroke patients.⁴⁴

4

Undernutrition at follow up is associated with:⁴⁴

- age (over 70 years)
- weight loss
- lack of community care.

Measurement of weight should continue after discharge, particularly in older stroke patients.

The psychosocial impact of compromised oral feeding should not be underestimated.¹⁰⁵ Re-evaluation of dietary recommendations often shows that a more extensive range of textures can be tolerated (see Annex 4).^{106,107}

3

A small number of patients with persisting dysphagia recover late and benefit from review and change in the management of their feeding. As with other disabilities following stroke, dysphagia may improve over time so regular review over the longer term is good practice.^{105,107-109} A named professional should be responsible for ensuring that such review occurs.

4

D Patients with persistent dysphagia should be reviewed regularly, at a frequency related to their individual swallowing function and dietary intake, by a professional skilled in the management of dysphagia.

Ongoing support from health professionals after initiating feeding is essential and there should be an infrastructure to support enterally fed patients in all settings.

A named professional, made known to the patient and carers, should have specific responsibility for the management of anyone discharged on PEG or NG feeding. This should also be considered for anyone on a modified diet.

An example protocol for postdischarge monitoring of patients on home enteral tube feeding is given in Annex 7.

6.2 EFFECT OF THERAPY ON PATIENT OUTCOME

6.2.1 DIET MODIFICATION AND USE OF COMPENSATORY TECHNIQUES

Diet modification is the alteration of the texture or viscosity of food and fluids. Compensatory techniques refer to postures (the manipulation of head or body posture) or manoeuvres (the manipulation of an isolated aspect of the swallowing mechanism). Therapy techniques are exercises or strategies designed to facilitate or stimulate the swallow. The objective of these strategies is to influence the speed and directional flow of the bolus.

Diet modification and use of postures or manoeuvres have been shown to be effective in specific individuals using videofluoroscopy and are standard management of dysphagia following stroke.^{19,110}

Observational studies of the effects of therapy interventions are variable in quality (eg small sample size, highly selected patients and no control group) but have shown a favourable effect.¹¹¹⁻¹¹⁴

2+
2-

Advice on diet modification and compensatory techniques is usually given following analysis of swallowing physiology. This advice is best offered following assessment of swallowing function on FEES or MBS.^{19,57} 3
4

One randomised controlled trial (RCT) conducted in a stroke rehabilitation unit examined the effect of intensity of therapist intervention on the occurrence of complications following MBS assessment.²⁹ Treatment consisted of diet modification and compensatory swallowing techniques. All groups also received written advice. When comparing written education versus fortnightly review versus daily review, no significant benefit was noted for the group with the highest degree of therapist intervention. 1+

D Advice on diet modification and compensatory techniques (postures and manoeuvres) should be given following full swallowing assessment.

6.2.2 TEXTURE MODIFICATION

The nutritional content of texture modified food may be reduced in the processing. It may also look unappetising leading to poor adherence to such diets.

National guidelines on texture modification and fluid thickness have been agreed between dietitians and speech and language therapists (see Annex 4).^{115,116} 4

D Texture modified food should be attractively presented and appetising. Patients should have a choice of dishes.

Texture modified meals may be fortified to enable patients to meet nutritional requirements.

Food and fluid intake should be monitored and, if indicated, a referral made to the dietitian.

6.2.3 OTHER THERAPY TECHNIQUES

There is no adequate evidence of the effectiveness of thermal stimulation and biofeedback in reducing pharyngeal delay. Other therapy techniques such as sensory enhancement or facilitation exercises are in use but remain unproven.^{117,118} Some innovative techniques are being researched but are not in current use.¹¹⁹⁻¹²³

6.3 OTHER CONSIDERATIONS

6.3.1 ORAL HYGIENE

Stroke patients with dysphagia may have particular problems in maintaining good oral hygiene. Oral hygiene is an important part of patient care and it should not be assumed that patients who cannot swallow and are being fed parenterally do not require mouth care. Good oral hygiene needs to be maintained in all patients to ensure that dental plaque is removed and pathogenic organisms are not allowed to proliferate in the mouth, preventing oral and dental disease^{124,125} and reducing the risk of aspiration pneumonia.^{33,43} Pre-existing disease should be recognised and the patient referred to a dentist for further examination. 4

D Good oral hygiene should be maintained in patients with dysphagia, particularly in those with PEG or NG tubes, in order to promote oral health and patient comfort.

An appropriate oral care protocol should be used for every patient with dysphagia, including those who use dentures (see Annex 5).

6.3.2 MEDICATION

Patients with dysphagia often have difficulty taking their medication.⁷⁶ Administration of medicines by NG and PEG tubes has some inherent problems. Alternative formulations of medicines, routes of administration, or medication may be available. It is not always appropriate to crush tablets to aid administration, as this may affect the pharmacokinetics or efficacy of the drug. Drug-feed interactions are also possible. Published guidance is available.¹²⁶

4

D Hospital and community pharmacists or medicines information centres should be consulted by the professional managing the patient's dysphagia, on the most appropriate method of administering medication.

6.4 CARE OF PATIENTS WITH DYSPHAGIA

Various training packages for nurses and carers have been described in the literature, appropriate for both community¹²⁷⁻¹²⁹ and acute care.^{41,75,79,81} The training packages differ in the level of input required from an individual, ranging from merely raising awareness of good practice, to specific training in all aspects of dysphagia care for a "Dysphagia Nurse Specialist".

4

All caregivers should have the knowledge and skills to feed patients with dysphagia safely.⁷⁶ Staff, carers and patients should be trained in feeding and monitoring patients with dysphagia.

D Staff, carers and patients should be trained in feeding techniques. This training should include:

- modifications of positioning and diet
- food placement
- management of behavioural and environmental factors
- delivery of oral care
- management of choking.

Assessment results and management recommendations should be carefully documented and communicated to the relevant health professionals, carers and patients.

6.5 THE EFFECT OF COMMUNICATIVE OR COGNITIVE IMPAIRMENT ON THE MANAGEMENT OF DYSPHAGIA PATIENTS

Barriers to effective communication (particularly dysphasia or confusion) are common in stroke patients with dysphagia. Patients with severe strokes and associated dysphasia (eg total anterior cerebral syndromes) or prior cognitive impairment tend to have a poorer prognosis than patients without these features.¹³⁰⁻¹³³

3

4

If an adult is incapable of acting, making, communicating, understanding, or remembering decisions, any medical treatment must be formally certified by the responsible medical practitioner under the terms of the Adults with Incapacity (Scotland) Act 2000.¹³⁴

D Communication, cognitive function, and the capacity for decision making should be routinely assessed in patients with dysphagia.

Information should be provided to patients with communicative or cognitive impairment in an appropriate manner (eg aphasia friendly literature).¹³⁵

7 Patient issues

7.1 PATIENT INVOLVEMENT IN GUIDELINE DEVELOPMENT

In November 2001, a meeting was held with eight patients and four carers with experience of stroke dysphagia. The meeting was facilitated by SIGN staff and members of the guideline development group. Attendees were asked to consider what they would have changed about their NHS care, what they most valued and what information they had received.

The feedback highlighted both positive and negative aspects of the NHS care the patients had received. The most consistent comment was the poor level of information received by patients and carers, as regards stroke in general, stroke dysphagia and the likely consequences of the condition.

Areas in which patients would have liked more and earlier information include:

- the causes of stroke and how to prevent another
- what help is available
- how they can help in their own care and recovery
- types of treatment available and how they work
- how drugs work and their possible side effects
- explanations of why treatments might change.

A series of patient and carer quotes are included in section 7.2 to highlight the main issues raised.

Given the information gap identified by patients, a literature search was performed to answer the question: what information is needed for patients and their families to understand and cope with the diagnosis, treatment and outcome? When and how should this information be given?

The small amount of published material identified was consistent with the general points raised by the patients.¹³⁶⁻¹⁵⁰

The views of the patients and carers also agreed with a survey of 1,206 stroke patients and carers carried out by the Clinical Standards Board for Scotland (now part of NHS Quality Improvement Scotland).¹⁵¹

This identified the following issues as being of most importance to the patients and carers (in order of priority):

- explanation of the condition given by the doctors and nurses
- adequate physiotherapy
- adequate speech and language therapy
- overall hospital care/treatment given
- information provided (eg leaflets on the condition, information on allowances available)
- postdischarge care (general lack of it barring one or two exceptions)
- opportunity to talk to doctors and nurses about the condition (ie the health professionals offering time to speak to patients and carers)
- understanding/attitude shown by the health professionals
- information on the likely outcome, degree of recovery or long term care needs
- adequate occupational therapy.

The participants stressed the value of the availability of a programme of therapies rather than occasional or limited numbers of sessions.

7.2 PATIENT AND CARER QUOTES

Carer: “A lot more information could have been given a lot earlier.”

Patient: “The treatment from the nurses on the ward was great once the speech and language therapist had given me the exercises.”

Carer: “There was a lack of continuing care after being discharged from the hospital. We could have benefited from longer treatment from a speech and language therapist.”

Carer: “I felt more involved with the speech therapist/occupational therapist and was kept much more informed. I learnt a lot more about the condition through working with them.”

Patient: “The doctor’s attitude left much to be desired. He was not very encouraging about me getting my PEG tube out and told me to prepare for the worst. I would like to have been told it was only temporary. I have now had the tube removed after 7 months.”

Patient: “The time taken to start the exercises to improve the muscles of the throat was very long. I had to wait 12 weeks and felt I had to practice this earlier myself.”

Patient: “I felt I was well looked after all the time – the girls took the time to come and talk to you and they were very nice.”

Patient: “I needed a better explanation about the treatment – the side effects, what each drug was for, the reasons for the treatment – it should have been explained to me step by step.”

Patient: “Perhaps the biggest handicap which I faced on leaving hospital was the inability to swallow my own saliva, requiring me to be continually spitting, which I felt very embarrassed about whenever I was in company.”

7.3 PATIENT PREFERENCES

Information should be imparted in a format suitable to the patient and carers.¹³⁵ Written information, such as the leaflets provided by Chest, Heart and Stroke Scotland, should be given to patients/carers to take away with them.

Patient feedback has suggested people experiencing stroke dysphagia appreciate receiving encouragement that their condition may improve.

- Stroke patients with dysphagia and their families or carers should be given information to enable them to make informed decisions about management of the swallowing disorder.
- Patients/carers should be informed about the full implications of their treatment, the timescale for altered diet or PEG feeding and how often they will be reviewed.

7.4 QUALITY OF LIFE

Research into the pathophysiology and management of swallowing has been clinically led. There is a paucity of data on health outcomes from the patient’s perspective, such as quality of life and patient satisfaction. Some attempts are now being made to redress this with the use of quality of life questionnaires and patient focused outcome measures.¹⁵²

- Healthcare professionals should be aware of the importance of the social aspects of eating. An inability to eat normally may affect patient morale, lead to feelings of isolation and could contribute to clinical depression.

7.5 USEFUL CONTACT DETAILS

The following organisations provide support and information for stroke patients and their carers:

British Association for Parenteral and Enteral Nutrition (BAPEN)

Website: www.bapen.org.uk

BAPEN has produced resources and information leaflets for healthcare professionals and patients on tube feeding and the administration of medicines.

Carers Scotland

91 Mitchell Street, Glasgow G1 3LN

Tel: 0141 221 9141 • CarersLine: Freephone 0808 808 7777

(Wed -Thur, 10 am - noon and 2 pm - 4 pm)

Chest, Heart and Stroke Scotland

65 North Castle Street, Edinburgh EH2 3LT

Advice Line: 0845 077 6000 • Tel: 0131 225 6963 • Fax: 0131 220 6313

Email: admin@chss.org.uk • Website: www.chss.org.uk

Chest, Heart and Stroke Scotland administer the Volunteer Stroke Service and other local stroke groups.

Different Strokes

9 Canon Harnett Court, Wolverton Mill, Milton Keynes MK12 5NF

Tel: 0845 130 7172 • Fax: 01908 313501

Email: info@differentstrokes.co.uk • Website: www.differentstrokes.co.uk

Moving Into Work

Norton Park, 57 Albion Road, Edinburgh EH7 5QY

Tel: 0131 475 2600 • Fax: 0131 475 2379

Employment consultancy and support for people after acquired brain injury

Braid House, Labrador Avenue, Howden Livingston EH54 6AU

Tel: 01506 443 100 • Fax: 01506 443 055

Email: moving@intowork.org.uk • Website: www.intowork.org.uk/moving

Princess Royal Trust for Carers (Glasgow Office)

Campbell House, 215 West Campbell Street, Glasgow G2 4TT

Tel: 0141 221 5066 • Fax: 0141 221 4623

Email: infoscotland@carers.org • Website: www.carers.org

Speakability

1 Royal Street, London SE1 7LL

Tel: 020 7261 9572 • Fax: 020 7928 9542 •

Helpline: Freephone 080 8808 9572 (Mon - Fri, 10 am - 4 pm)

Email: speakability@speakability.org.uk • Website: www.speakability.org.uk

8 Implementation, audit and further research

8.1 LOCAL IMPLEMENTATION

Implementation of national clinical guidelines is the responsibility of each NHS Health Board and is an essential part of clinical governance. It is acknowledged that every Health Board cannot implement every guideline immediately on publication, but mechanisms should be in place to ensure that the care provided is reviewed against the guideline recommendations and the reasons for any differences assessed and, where appropriate, addressed. These discussions should involve both clinical staff and management. Local arrangements may then be made to implement the national guideline in individual hospitals, units and practices, and to monitor adherence. This may be done by a variety of means including patient-specific reminders, continuing education and training, and clinical audit.

8.2 KEY POINTS FOR AUDIT

Data should be collected to confirm that:

- comorbidities and correctable risk factors are assessed on admission
- nutritional risk is assessed within 48 hours of admission
- screening for dysphagia takes place before any food/drink is given
- screening for dysphagia in inpatients is repeated daily for a minimum of one week after initial assessment
- criteria are in place to highlight the need for referral to a dietitian or SLT and referral procedures are in place
- documentation of nutritional management of the patient (including justification of the decision not to feed, consistency of modified diets and monitoring of food and fluid intake) is available
- non-compliance of patients on modified oral intake does not reflect lack of appropriate care
- the patient has received the modified diet and drinks that have been recommended
- a pharmacist is involved/consulted at an early stage
- multidisciplinary training programmes are in place
- the timing, institution and complications of tube feeding (NG and PEG) are recorded
- named professional in charge of patients discharged with NG or PEG has been identified
- an oral care protocol is in place
- patients with persistent dysphagia are reviewed
- the relevant information has been imparted to the patient and family/carer in an appropriate format
- professionals, patients and carers are aware of the forthcoming Clinical Standards for Stroke Services published by NHS Quality Improvement Scotland.

8.3 RECOMMENDATIONS FOR RESEARCH

Prospective controlled trials are required to evaluate which variable of the screening and management modalities for dysphagia result in the best outcome. Studies should be of sufficient size and with a representative stroke population. Specifically, the following areas lack a strong evidence base:

- predictors of aspiration
- predictors of aspiration pneumonia
- nutrition screening tools for stroke patients
- the standardisation of the clinical bedside assessment
- the effectiveness of instrumental assessments
- optimum feeding methods and timing of feeding
- impact of long term PEG feeding on quality of life
- use of oral nutritional supplements to improve nutritional status in stroke patients with dysphagia
- the most effective intensity of treatment
- the effectiveness of thermal stimulation/biofeedback
- optimum delivery of care to people with chronic dysphagia in the community
- the effectiveness of nursing staff and family/carer education programmes
- the exploration of the patient's experience of dysphagia and its relation to quality of life after stroke.

9 Development of the guideline

9.1 INTRODUCTION

SIGN is a collaborative network of clinicians and other healthcare professionals, funded by NHS Quality Improvement Scotland. SIGN guidelines are developed by multidisciplinary groups of practising clinicians using a standard methodology, based on a systematic review of the evidence. Further details about SIGN and the guideline development methodology are contained in “SIGN 50: A Guideline developer’s handbook” available at www.sign.ac.uk

9.2 THE GUIDELINE DEVELOPMENT GROUP

Ms Iris Clarke (<i>Chair</i>)	<i>Speech and Language Therapist, Raigmore Hospital, Inverness</i>
Mrs Catherine Dunnet (<i>Secretary</i>)	<i>Head of Speech and Language Therapy Service, Glasgow Royal Infirmary</i>
Ms Jane Camp	<i>Clinical Governance Practice Development Nurse, Gartnavel Royal Hospital, Glasgow</i>
Dr David Campbell	<i>General Practitioner, Irvine</i>
Ms Francesca Chappell	<i>Information Officer, SIGN</i>
Dr Ali El-Ghorr	<i>Programme Manager, SIGN</i>
Sister Hazel Fraser	<i>Stroke Coordinator, Queen Margaret Hospital, Dunfermline</i>
Dr Julian Guse	<i>Consultant Radiologist, Monklands Hospital, Airdrie</i>
Dr Ray Holden	<i>Consultant Gastroenterologist, Monklands Hospital, Airdrie</i>
Dr Romana Hunter	<i>Clinical Lecturer, Dundee Dental School</i>
Dr Roberta James	<i>Programme Manager, SIGN</i>
Mrs Morag Ogilvie	<i>Senior Dietitian, St John’s Hospital, Livingston</i>
Dr Brian Pentland	<i>Consultant Physician, Astley Ainslie Hospital, Edinburgh</i>
Ms Fiona Small	<i>Physiotherapist, Western General Hospital, Edinburgh</i>
Professor David Stott	<i>Consultant in Geriatric Medicine, Glasgow Royal Infirmary</i>
Ms Fiona Strachan	<i>Senior Dietitian, Woodend Hospital, Aberdeen</i>
Ms Gillian Wilson	<i>Speech and Language Therapist, Victoria Infirmary, Glasgow</i>
Mrs Kathryn Wood	<i>Principal Pharmacist, Tayside Primary Care Trust</i>

The membership of the guideline development group was confirmed following consultation with the member organisations of SIGN. Declarations of interests were made by all members of the guideline development group. Further details are available from the SIGN Executive. Guideline development and literature review expertise, support, and facilitation were provided by the SIGN Executive.

9.3 SYSTEMATIC LITERATURE REVIEW

The evidence base for this guideline was synthesised in accordance with SIGN methodology. A systematic review of the literature was carried out using an explicit search strategy devised by a SIGN Information Officer. Databases searched include Medline, Embase, Healthstar, Cinahl, and the Cochrane Library. The main part of the strategy was based on that used by the Cochrane Library. The year range covered was 1980-2001. Internet searches were carried out on various websites including the New Zealand Guidelines Programme, the UK Health Technology Assessment programme, and the US National Guidelines Clearinghouse. The Medline version of the main search strategies can be found on the SIGN website, in the section covering supplementary guideline material. The main searches were supplemented by material identified by individual members of the development group. All selected papers were evaluated by two members of the group using standard SIGN methodological checklists before conclusions were considered as evidence.

9.4 CONSULTATION AND PEER REVIEW

9.4.1 NATIONAL OPEN MEETING

A national open meeting is the main consultative phase of SIGN guideline development, at which the guideline development group presents its draft recommendations for the first time. The national open meeting for this guideline was held on 16 May 2002 and was attended by 100 representatives of all the key specialties relevant to the guideline. The draft guideline was also available on the SIGN website for a limited period at this stage to allow those unable to attend the meeting to contribute to the development of the guideline.

9.4.2 SPECIALIST REVIEW

The guideline was also reviewed in draft form by a panel of independent expert referees, who were asked to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence base supporting the recommendations in the guideline. SIGN is very grateful to all of these experts for their contribution to this guideline.

Dr Alan Begg	<i>General Practitioner, Montrose</i>
Professor Martin Dennis	<i>Professor in Stroke Medicine, Department of Clinical Neurosciences, Western General Hospital, Edinburgh</i>
Professor Peter Donnelly	<i>Director of Public Health and Health Policy, NHS Lothian</i>
Dr George Duncan	<i>Consultant in Care of the Elderly, Ayrshire Central Hospital, Irvine</i>
Ms Alison French	<i>Senior Dietitian, Member of the Joint Working Party – National Descriptors for Texture Modification, British Dietetic Association, Birmingham</i>
Professor Ian Gilmore	<i>Consultant Physician and Gastroenterologist, Royal Liverpool University Hospital, and Honorary Professor of Medicine, Liverpool University</i>
Ms Tara Hegney	<i>Senior Dietitian, Royal Edinburgh Hospital</i>
Ms Penny Irwin	<i>Programme Coordinator - Stroke, Royal College of Physicians, London</i>
Ms Therese Jackson	<i>Head Occupational Therapist, Grampian University Hospitals NHS Trust, Aberdeen</i>
Ms Karen Krawczyk	<i>Speech and Language Therapist, Glasgow</i>
Dr Ron MacWalter	<i>Consultant Physician, Ninewells Hospital, Dundee</i>
Mr John McCall	<i>Stroke Specialist Nurse, Falkirk Royal Infirmary</i>
Dr John Norton	<i>General Practitioner, Ardrossan</i>
Ms Kerry Sainsbury	<i>Senior Dietitian, Borders General Hospital, Melrose</i>
Mr Cameron Sellars	<i>Speech and Language Therapist, Glasgow Royal Infirmary</i>
Dr David Smithard	<i>Head of Elderly and Stroke Medicine, William Harvey Hospital, Kent</i>

Ms Susan Watt	<i>Education and Clinical Effectiveness Advisor, Royal College of Nursing, Scotland</i>
Professor Mark Wiles	<i>Head of Medicine and Section of Neurology, University of Wales College of Medicine, Cardiff</i>
Professor Janet Wilson	<i>Professor of Otolaryngology, Head and Neck Surgery, University of Newcastle</i>

9.4.3 SIGN EDITORIAL GROUP

As a final quality control check, the guideline is reviewed by an Editorial Group comprising the relevant specialty representatives on SIGN Council to ensure that the peer reviewers' comments have been addressed adequately and that any risk of bias in the guideline development process as a whole has been minimised. The Editorial Group for this guideline was as follows:

Dr David Alexander	<i>Scottish General Practice Committee</i>
Professor Ian Campbell	<i>Royal College of Physicians of Edinburgh</i>
Professor Gordon Lowe	<i>Chairman of SIGN</i>
Miss Tracy Nairn	<i>Senior Professional Adviser, South Glasgow University Hospitals NHS Trust</i>
Dr Safia Qureshi	<i>SIGN Programme Director</i>
Dr Sara Twaddle	<i>Director of SIGN</i>
Professor Joanna Wardlaw	<i>Royal College of Radiologists, Faculty of Radiology</i>
Dr Bernice West	<i>National Nursing, Midwifery and Health Visiting Advisory Committee</i>

Each member of the guideline development group then approved the final guideline for publication.

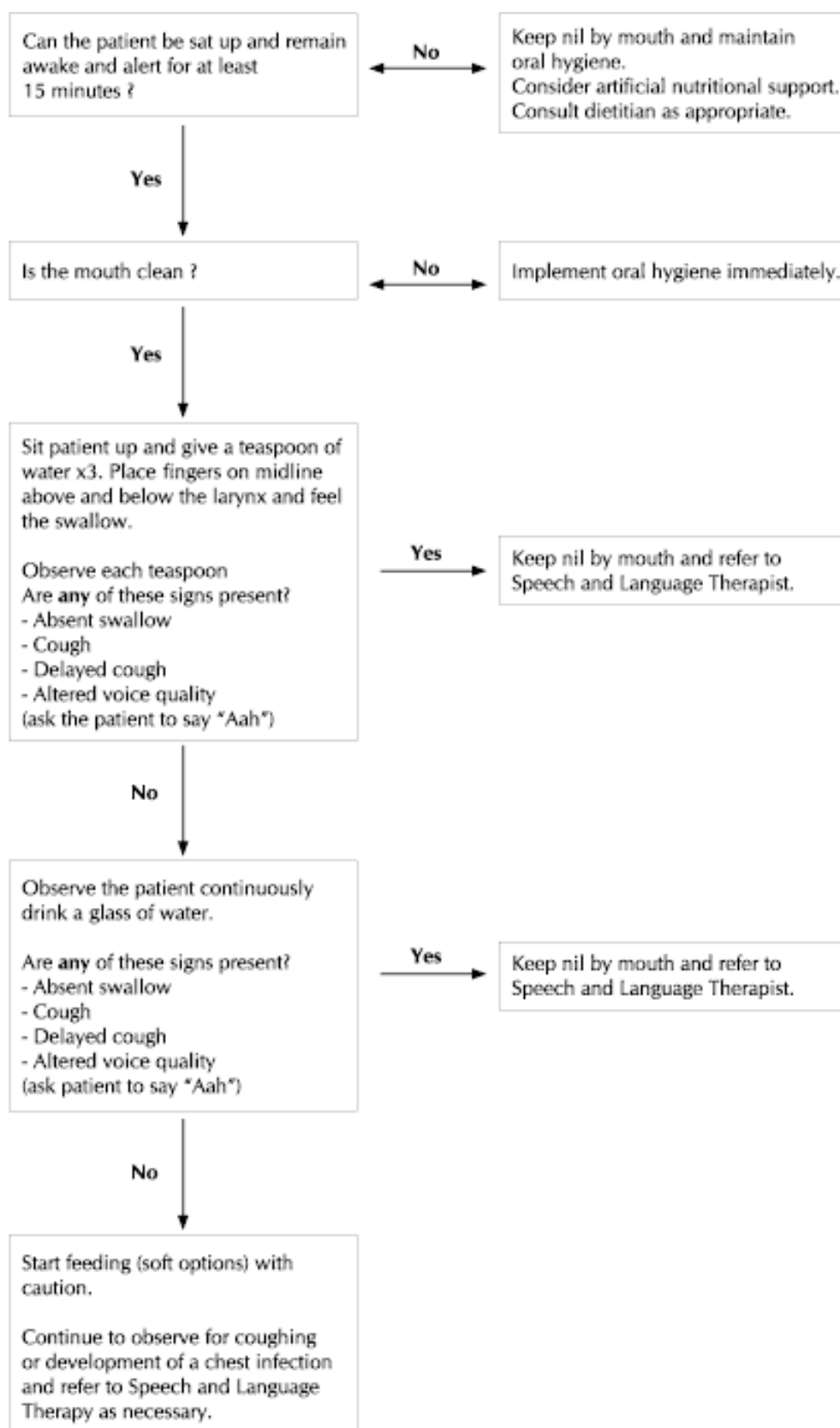
9.5 ACKNOWLEDGEMENTS

SIGN is grateful to the following former members of the guideline development group and others who have contributed to the development of this guideline:

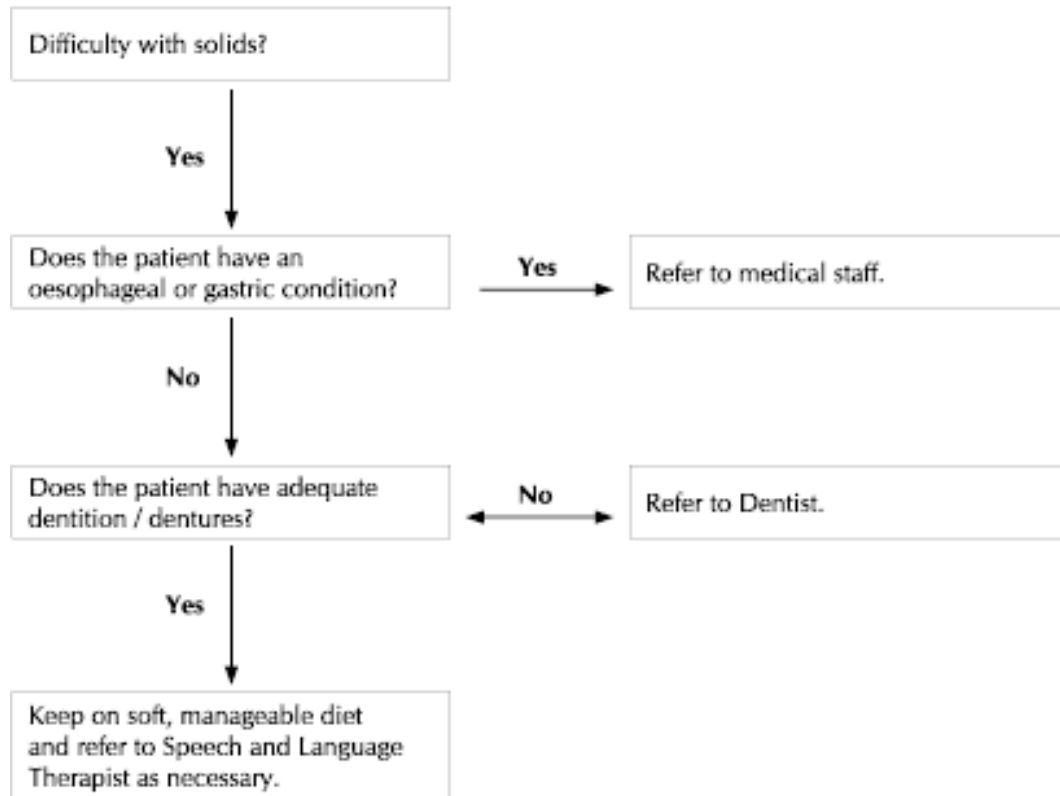
Dr Subrata Ghosh	<i>Consultant Gastroenterologist, Edinburgh</i>
Mr Duncan Hope	<i>Lay representative</i>
Dr Jill Pell	<i>Consultant in Public Health, Greater Glasgow Health Board</i>
Dr George Savage	<i>General Practitioner, Perthshire</i>

Annex 1 Example swallow screening procedure

Source: Department of Speech and Language Therapy, Raigmore Hospital, Inverness.



Annex 1 (continued)



Annex 2 Example clinical bedside assessment

The following clinical bedside assessment, was developed by Logemann. For further instructions and for interpretation of the results, refer to the original article.³¹

Categories of variables on the Northwestern Dysphagia Patient Check Sheet: each variable is rated as "safe" or "unsafe" for each patient.

	Safe	Unsafe
Medical history variables		
1. History of recurrent pneumonia	<input type="checkbox"/>	<input type="checkbox"/>
2. Frequent temperature spikes	<input type="checkbox"/>	<input type="checkbox"/>
3. Question of aspiration pneumonia	<input type="checkbox"/>	<input type="checkbox"/>
4. Long term intubation (+ 1 wk) or tracheostomy (+ 6 mo)	<input type="checkbox"/>	<input type="checkbox"/>
Behavioural variables		
5. Alertness	<input type="checkbox"/>	<input type="checkbox"/>
6. Cooperativeness/agitation	<input type="checkbox"/>	<input type="checkbox"/>
7. Attention/interaction ability	<input type="checkbox"/>	<input type="checkbox"/>
8. Awareness of problem(s) swallowing	<input type="checkbox"/>	<input type="checkbox"/>
9. Awareness of secretions	<input type="checkbox"/>	<input type="checkbox"/>
10. Ability to manage secretions	<input type="checkbox"/>	<input type="checkbox"/>
Gross motor function		
11. Postural control	<input type="checkbox"/>	<input type="checkbox"/>
12. Fatigability	<input type="checkbox"/>	<input type="checkbox"/>
Oral motor test results		
13. Oral, pharyngeal, laryngeal anatomy and physiology	<input type="checkbox"/>	<input type="checkbox"/>
14. Ability to follow directions	<input type="checkbox"/>	<input type="checkbox"/>
15. Dysarthria	<input type="checkbox"/>	<input type="checkbox"/>
16. Facial weakness	<input type="checkbox"/>	<input type="checkbox"/>
17. Oral apraxia	<input type="checkbox"/>	<input type="checkbox"/>
18. Oral sensation	<input type="checkbox"/>	<input type="checkbox"/>
19. Pharyngeal wall contraction on gag	<input type="checkbox"/>	<input type="checkbox"/>
20. Saliva swallowing	<input type="checkbox"/>	<input type="checkbox"/>
21. Voluntary cough, throat clearing	<input type="checkbox"/>	<input type="checkbox"/>
Observations during trial swallows: 1 cc thin liquid, 1 cc pudding, ¼ biscuit (if chewing were possible)		
22. Apraxia of swallow	<input type="checkbox"/>	<input type="checkbox"/>
23. Oral residue	<input type="checkbox"/>	<input type="checkbox"/>
24. Coughing/throat clearing	<input type="checkbox"/>	<input type="checkbox"/>
25. Delayed pharyngeal swallow	<input type="checkbox"/>	<input type="checkbox"/>
26. Reduced laryngeal elevation	<input type="checkbox"/>	<input type="checkbox"/>
27. Gurgly voice	<input type="checkbox"/>	<input type="checkbox"/>
28. Multiple swallows per bolus	<input type="checkbox"/>	<input type="checkbox"/>

Three additional summary variables are created from the categories above:

1. the total number of unsafe observations made on the 28 variables in all categories.
2. the total number of unsafe observations made on behavioural and gross motor function variables.
3. the total number of unsafe observations made during oral motor testing and observations during trial swallows.

Annex 3 The modified barium swallow assessment using videofluoroscopy

An example standard protocol for the modified barium swallow assessment using videofluoroscopy (adapted from a published protocol):¹⁵³

Lateral projection, patient sitting in usual position of comfort

Speech sample

Swallow 5 ml of thick liquid from a spoon

Drink thick liquid from a cup (1 swallow)

Swallow 5 ml of thin liquid from a spoon

Drink thin liquid from a cup (1 swallow)

Modifications and other liquids as appropriate

Masticate and swallow 1 teaspoon (or ¼ biscuit) formable solid food (category A) – patient seated in usual position of comfort with head in neutral position

Masticate and swallow 1 teaspoon particulate solid food (category B)

Modifications and other foods as appropriate

Postero-anterior projection, patient sitting upright with neck slightly extended if possible

Take thin liquid from a cup, hold it in the mouth, and then swallow

Modifications or other foods as appropriate

Additional swallows of thin liquid as needed for imaging the oesophagus

An example MBS rating scale is shown on the next page.

Annex 3 (continued)

ORAL PHASE							
	NORMAL	ABNORMAL *NFR	ABNORMAL		LIQUID	PASTE	SOLID
LIP SEAL							
CHEWING ACTION							
ORAL CONTROL OF BOLUS							
LOSS OF BOLUS TO PHARYNX							
TONGUE STRIPPING ACTION							
PHARYNGEAL PHASE							
TRIGGERING OF SWALLOW REFLEX							
RESIDUE							
CRICOPHARYNGEAL FUNCTION							
LARYNGEAL ELEVATION							
PHARYNGEAL PHASE (ANTERO-POSTERIOR VIEW)							
HEMIPARESIS							
LARYNGEAL CLOSURE							
RESIDUE ON VOCAL CORDS							
ASPIRATION							
POTENTIAL/OBSERVED (P/O)	: BEFORE SWALLOW						
(NORMAL = 1 P = 2 O = 3)	: DURING SWALLOW						
	: AFTER SWALLOW						

(*NFR = NOT FUNCTIONALLY RELEVANT)

SCORING:

1 = NORMAL, ABNORMAL/NFR*

2-5 = ABNORMAL (SLIGHT-SEVERE)

6 = NOT ATTEMPTED OR NOT OBSERVED

ADDITIONS TO STANDARD PROCEDURE:

FURTHER COMMENTS:

SIGNED:

Source: Dunnet & Sellars 1990 unpublished study. It is advised that clear criteria be established for each category of answer in order to provide rating consistency.

Annex 4 Guidelines on texture modification and fluid thickness

From the British Dietetic Association and the Royal College of Speech and Language Therapists joint document: National Descriptors for Texture Modification in Adults, 2002.¹¹⁵

TEXTURE MODIFICATION - FOOD

TEXTURE	DESCRIPTION OF FOOD TEXTURE	FOOD EXAMPLES
A	<ul style="list-style-type: none"> ■ a smooth, pouring, uniform consistency ■ a food that has been pureed and sieved to remove particles ■ a thickener may be added to maintain stability ■ cannot be eaten with a fork 	<ul style="list-style-type: none"> ■ tinned tomato soup ■ thin custard
B	<ul style="list-style-type: none"> ■ a smooth, uniform consistency ■ a food that has been pureed and sieved to remove particles ■ a thickener may be added to maintain stability ■ cannot be eaten with a fork ■ drops rather than pours from a spoon but cannot be piped and layered ■ thicker than A 	<ul style="list-style-type: none"> ■ soft whipped cream ■ thick custard
C	<ul style="list-style-type: none"> ■ a thick, smooth, uniform consistency ■ a food that has been pureed and sieved to remove particles ■ a thickener may be added to maintain stability ■ can be eaten with a fork or spoon ■ will hold its own shape on a plate, and can be moulded, layered and piped ■ no chewing required 	<ul style="list-style-type: none"> ■ mousse ■ smooth fromage frais
D	<ul style="list-style-type: none"> ■ food that is moist, with some variation in texture ■ has not been pureed or sieved ■ these foods may be served or coated with a thick gravy or sauce ■ foods easily mashed with a fork ■ meat should be prepared as C ■ requires very little chewing 	<ul style="list-style-type: none"> ■ flaked fish in thick sauce ■ stewed apple and thick custard
E	<ul style="list-style-type: none"> ■ dishes consisting of soft, moist food ■ foods can be broken into pieces with a fork ■ dishes can be made up of solids and thick sauces or gravies ■ avoid foods which cause choking hazard (<i>see list of High Risk Foods</i>) 	<ul style="list-style-type: none"> ■ tender meat casseroles (approximately 1.5 cm diced pieces) ■ sponge and custard
Normal	Any foods	Include all foods from "High Risk Foods" list

Annex 4 (continued)

HIGH RISK FOODS

Stringy, fibrous texture including pineapple, runner beans, celery, lettuce
Vegetable and fruit skins including beans (eg broad, baked, soya, black-eye), peas, grapes
Mixed consistency foods including cereals which do not blend with milk, (eg muesli), mince with thin gravy, soup with lumps
Crunchy foods including toast, flaky pastry, dry biscuits, crisps
Crumbly items including bread crusts, pie crusts, crumble, dry biscuits
Hard foods including boiled and chewy sweets and toffees, nuts and seeds
Husks including sweetcorn and granary bread

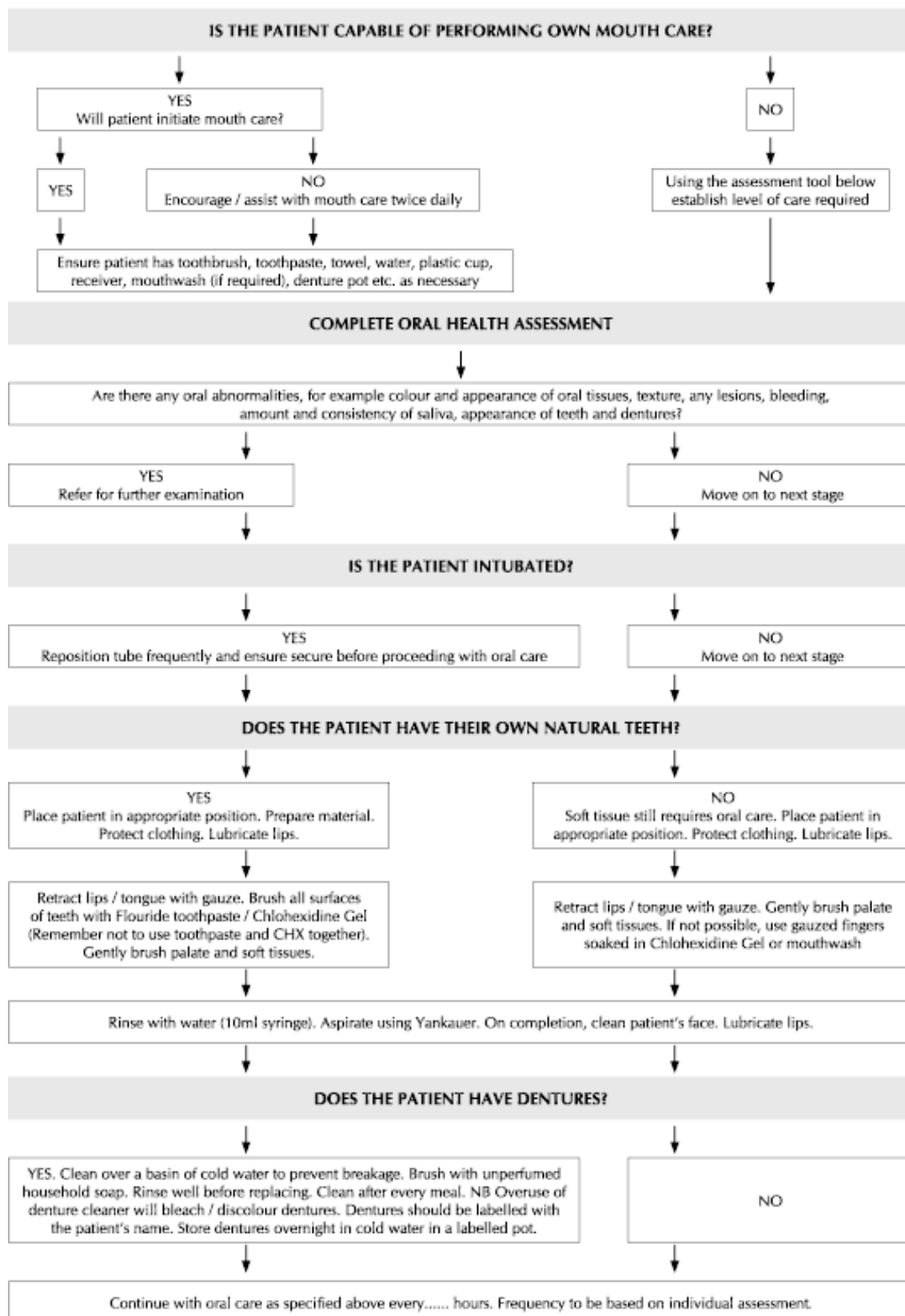
TEXTURE MODIFICATION - FLUID

TEXTURE	DESCRIPTION OF FLUID TEXTURE	FLUID EXAMPLES
Thin fluid	still water	water, tea, coffee without milk, diluted squash, spirits, wine
Naturally thick fluid	product leaves a coating on an empty glass	full cream milk, cream liqueurs, Complan, Build Up (made to instructions), Nutriment, commercial sip feeds
Thickened fluid	Fluid to which a commercial thickener has been added to thicken consistency	
Stage 1 =	<ul style="list-style-type: none"> ■ can be drunk through a straw ■ can be drunk from a cup if advised or preferred ■ leaves a thin coat on the back of a spoon 	
Stage 2 =	<ul style="list-style-type: none"> ■ cannot be drunk through a straw ■ can be drunk from a cup ■ leaves a thick coat on the back of a spoon 	
Stage 3 =	<ul style="list-style-type: none"> ■ cannot be drunk through a straw ■ cannot be drunk from a cup ■ needs to be taken with a spoon 	

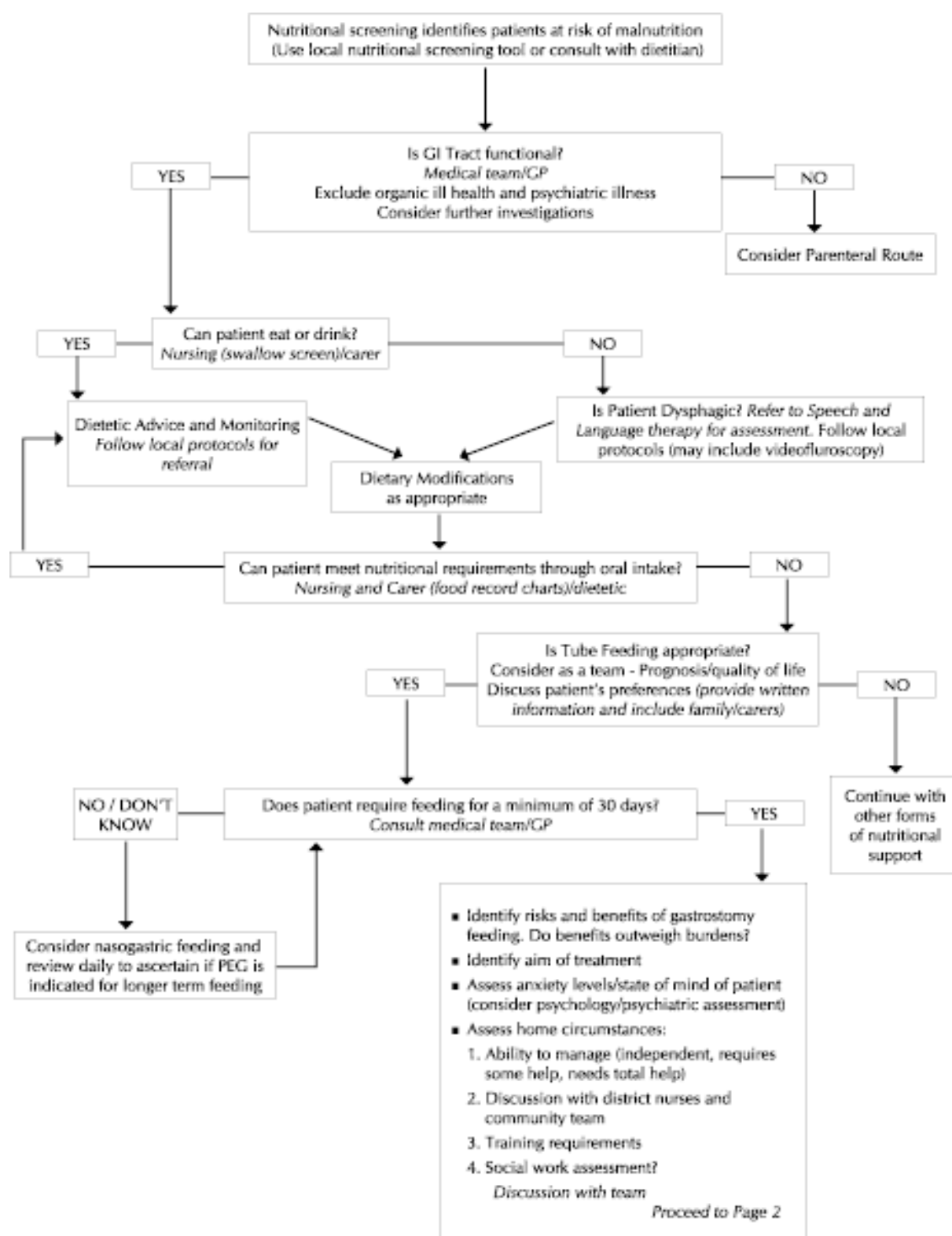
NHS Quality Improvement Scotland, has produced clinical standards on "Food, Fluids and Nutritional Care in Hospitals" (www.nhshealthquality.org).¹¹⁷

Annex 5 Example oral care protocol

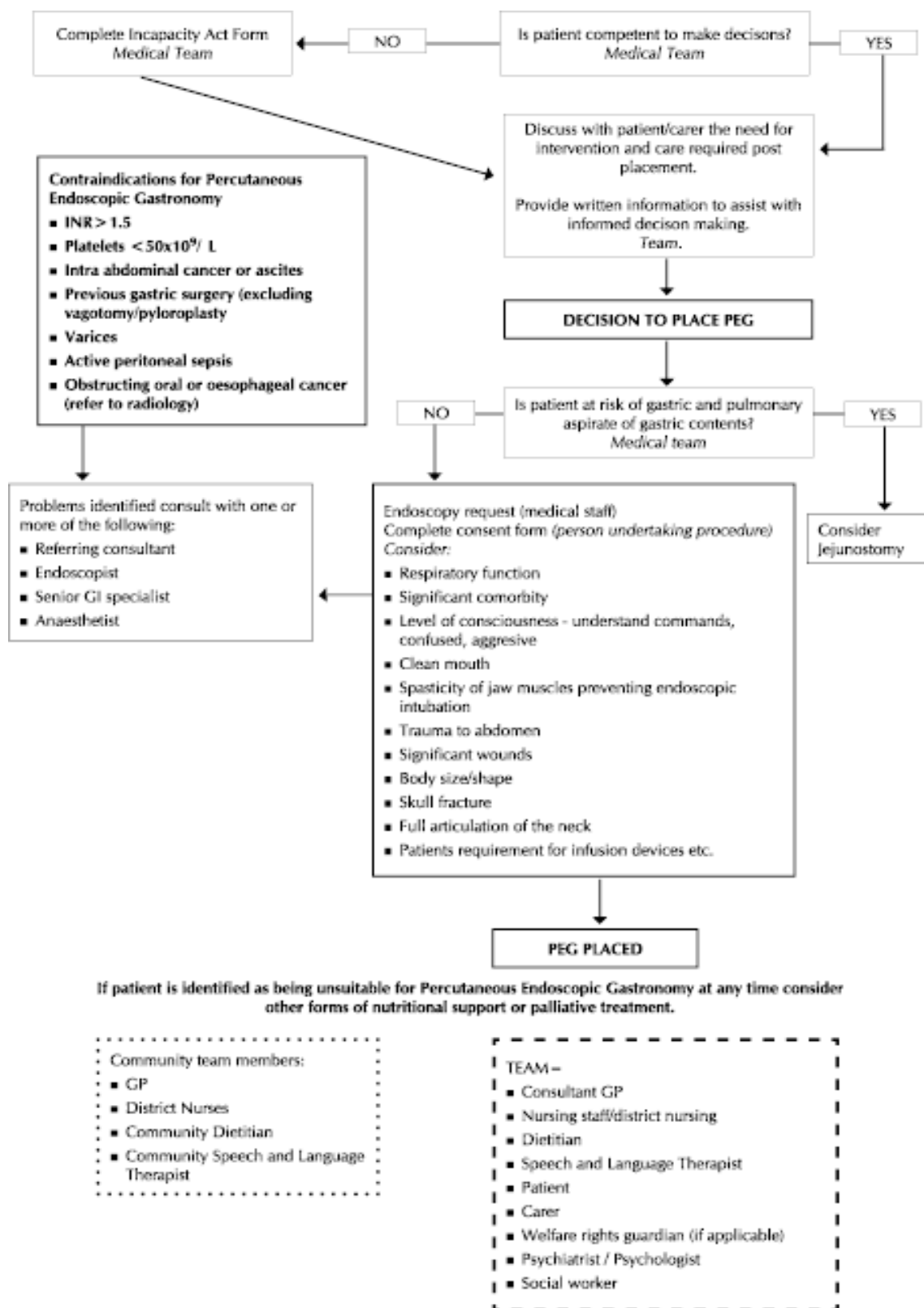
Reproduced with permission from Griffiths and Lewis¹²⁴



Annex 6 Assessment of patient suitability for PEG tube

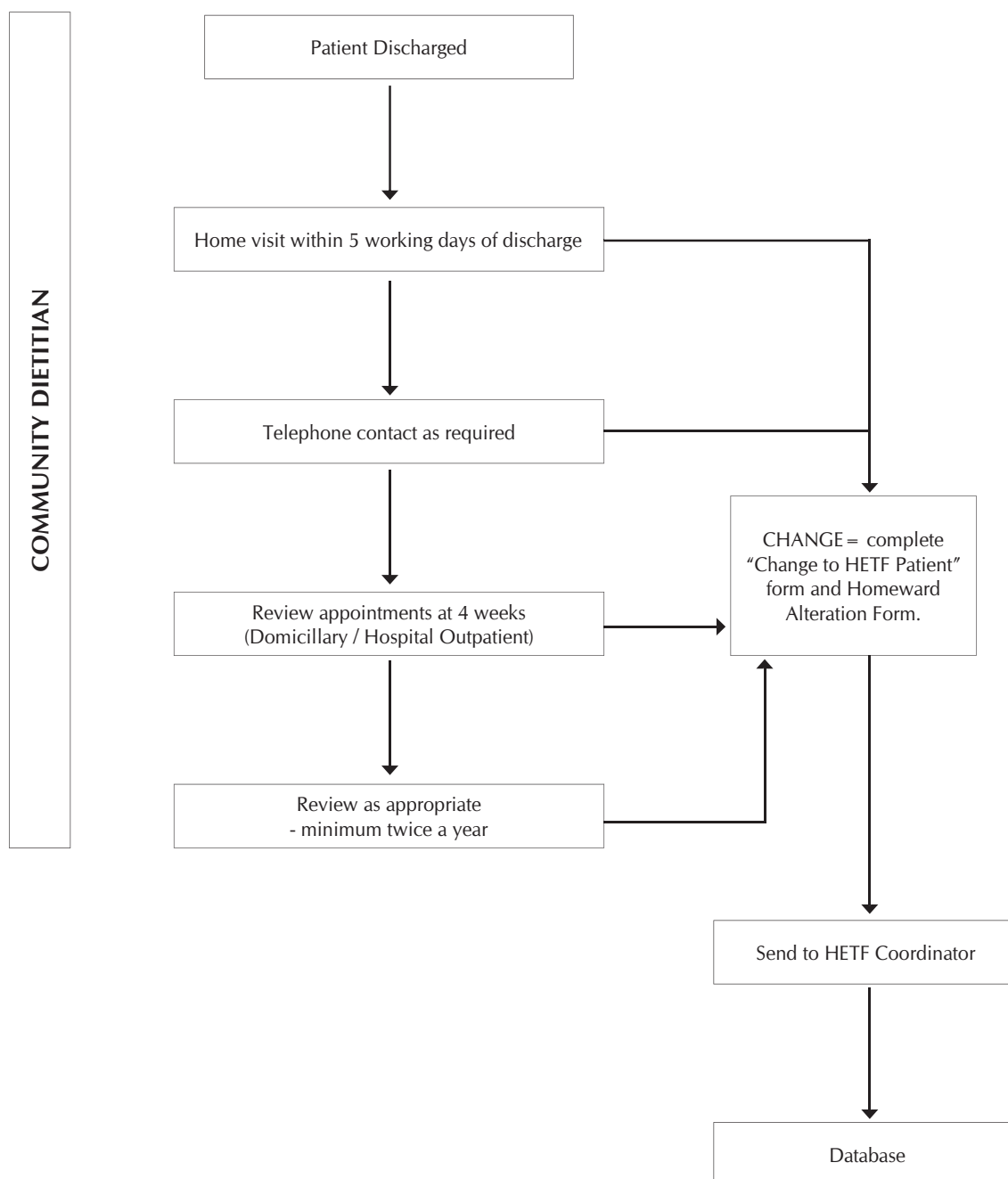


Annex 6 (continued)



Reproduced with permission from Lothian Enteral Tube Feeding Assessment Group, August 2003.

Annex 7 Postdischarge monitoring for patients on home enteral tube feeding



Community Dietitian will liaise with relevant healthcare professionals to ensure that appropriate monitoring is carried out.

Reproduced with permission and based on Lothian Enteral Tube Feeding - Best Practice Statements for Adults and Children. December 2002.

References

- Cerebrovascular disorders: a clinical and research classification. World Health Organisation, Geneva; 1978.
- Smithard DG, O'Neill PA, England RE, Park CL, Wyatt R, Martin DF, et al. The natural history of dysphagia following a stroke. *Dysphagia* 1997;12(4):188-93.
- Celifarco A, Gerard G, Faegenburg D, Burakoff R. Dysphagia as the sole manifestation of bilateral strokes. *Am J Gastroenterol* 1990;85(5):610-3.
- Buchholz DW. Clinically probable brainstem stroke presenting primarily as dysphagia and nonvisualized by MRI. *Dysphagia* 1993;8(3):235-8.
- Nakagawa T, Sekizawa K, Nakajoh K, Tanji H, Arai H, Sasaki H. Silent cerebral infarction: a potential risk for pneumonia in the elderly. *J Intern Med* 2000;247(2):255-9.
- Lee BC, Hwang SH, Chang GY. Isolated dysphagia due to a medullary infarction: a new lacunar syndrome. *Eur Neurol* 1999;41(1):53-4.
- Mann G, Hankey GJ, Cameron D. Swallowing function after stroke: prognosis and prognostic factors at 6 months. *Stroke* 1999;30(4):744-8.
- Daniels SK, Brailey K, Priestley DH, Herrington LR, Weisberg LA, Foundas AL. Aspiration in patients with acute stroke. *Arch Phys Med Rehabil* 1998;79(1):14-9.
- Kidd D, Lawson J, Nesbitt R, MacMahon J. Aspiration in acute stroke: A clinical study with videofluoroscopy. *Q J Med* 1993;86(12):825-9.
- Gordon C, Hewer RL, Wade DT. Dysphagia in acute stroke. *BMJ* 1987;295(6595):411-4.
- Smithard DG, O'Neill PA, Parks C, Morris J. Complications and outcome after acute stroke. Does dysphagia matter? [erratum appears in *Stroke* 1998 Jul;29(7):1480-1]. *Stroke* 1996;27(7):1200-4.
- Kidd D, Lawson J, Nesbitt R, MacMahon J. The natural history and clinical consequences of aspiration in acute stroke. *Q J Med* 1995;88(6):409-13.
- Barer DH. The natural history and functional consequences of dysphagia after hemispheric stroke. *J Neurol Neurosurg Psychiatry* 1989;52(2):236-41.
- Sala R, Munto MJ, de la Calle J, Preciado I, Miralles T, Cortes A, et al. Swallowing changes in cerebrovascular accidents: incidence, natural history, and repercussions on the nutritional status, morbidity, and mortality. *Rev Neurol* 1998;27(159):759-66.
- Finestone HM, Greene-Finestone LS, Wilson ES, Teasell RW. Prolonged length of stay and reduced functional improvement rate in malnourished stroke rehabilitation patients. *Arch Phys Med Rehabil* 1996;77(4):340-5.
- Gariballa SE, Parker SG, Taub N, Castleden CM. Influence of nutritional status on clinical outcome after acute stroke. *Am J Clin Nutr* 1998;68(2):275-81.
- Ellul J, Watkins C, Barer D. Frequency, clinical course and complications of dysphagia in acute stroke, studied using a standardised bedside swallowing assessment. The Merseyside and North West Stroke Dysphagia Collaboration; 1993. [cited 14 Feb 2003]. Available from url: <http://www.ncl.ac.uk/stroke-research-unit/costar/papD1.doc>
- Teasell RW, Bach D, McRae M. Prevalence and recovery of aspiration poststroke: a retrospective analysis. *Dysphagia* 1994;9(1):35-9.
- Diagnosis and treatment of swallowing disorders (dysphagia) in acute-care stroke patients. Agency for Health Care Policy and Research. Evidence Report/Technology Assessment 8; 1999. [cited 14 Feb 2003]. Available from url: <http://www.ahrp.gov/clinic/epcsums/dysphsum.htm>
- Ellul J, Gibson P, Barer D. Detection and management of swallowing problems in acute stroke: preliminary evaluation of a dysphagia management policy. The Merseyside and North West Stroke Dysphagia Collaboration; 1994. [cited 14 Feb 2003]. Available from url: <http://www.ncl.ac.uk/stroke-research-unit/costar/papD2.doc>
- Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke part I: Assessment, investigation, immediate management and secondary prevention. Edinburgh: SIGN; 1997. (SIGN publication no. 13).
- Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke part II: Management of carotid stenosis and carotid endarterectomy. Edinburgh: SIGN; 1997. (SIGN publication no. 13).
- Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke part III: Identification and management of dysphagia. Edinburgh: SIGN; 1997. (SIGN publication no. 20).
- Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke part IV: Rehabilitation, prevention and management of complications, and discharge planning. Edinburgh: SIGN; 1998. (SIGN publication no. 24).
- Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke: Rehabilitation, prevention and management of complications, and discharge planning. Edinburgh: SIGN; 2002. (SIGN publication no. 64).
- Perry L, Love CP. Screening for dysphagia and aspiration in acute stroke: a systematic review. *Dysphagia* 2001;16(1):7-18.
- Martino R, Pron G, Diamant N. Screening for oropharyngeal dysphagia in stroke: insufficient evidence for guidelines. *Dysphagia* 2000;15(1):19-30.
- Holas MA, DePippo KL, Reding MJ. Aspiration and relative risk of medical complications following stroke. *Arch Neurol* 1994;51(10):1051-3.
- DePippo KL, Holas MA, Reding MJ, Mandel FS, Lesser ML. Dysphagia therapy following stroke: a controlled trial. *Neurology* 1994;44(9):1655-60.
- Schmidt J, Holas M, Halvorson K, Reding M. Videofluoroscopic evidence of aspiration predicts pneumonia and death but not dehydration following stroke. *Dysphagia* 1994;9(1):7-11.
- Johnson ER, McKenzie SW, Sievers A. Aspiration pneumonia in stroke [corrected] [published erratum appears in *Arch Phys Med Rehabil* 1994 Jun;75(6):665]. *Arch Phys Med Rehabil* 1993;74(9):973-6.
- Ding R, Logemann JA. Pneumonia in stroke patients: a retrospective study. *Dysphagia* 2000;15(2):51-7.
- Langmore SE, Terpenning MS, Schork A, Chen Y, Murray JT, Lopatin D, et al. Predictors of aspiration pneumonia: how important is dysphagia. *Dysphagia* 1998;13(2):69-81.
- Kalra L, Yu G, Wilson K, Roots P. Medical complications during stroke rehabilitation. *Stroke* 1995;26(6):990-4.
- Dromerick A, Reding M. Medical and neurological complications during inpatient stroke rehabilitation. *Stroke* 1994;25(2):358-61.
- Linden P, Siebens AA. Dysphagia: predicting laryngeal penetration. *Arch Phys Med Rehabil* 1983;64(6):281-4.
- Smithard DG, O'Neill PA, Park C, England R, Renwick DS, Wyatt R, et al. Can bedside assessment reliably exclude aspiration following acute stroke? *Age Ageing* 1998;27(2):99-106.
- Logemann JA, Veis S, Colangelo L. A screening procedure for oropharyngeal dysphagia. *Dysphagia* 1999;14(1):44-51.
- Horner J, Buoyer FG, Alberts MJ, Helms MJ. Dysphagia following brain-stem stroke. Clinical correlates and outcome. *Arch Neurol* 1991;48(11):1170-3.
- Aviv JE, Sacco RL, Mohr JP, Thompson JL, Levin B, Sunshine S, et al. Laryngopharyngeal sensory testing with modified barium swallow as predictors of aspiration pneumonia after stroke. *Laryngoscope* 1997;107(9):1254-60.
- Herbert S. A team approach to the treatment of dysphagia. *Nurs Times* 1996;92(50):26-9.
- Nakajoh K, Nakagawa T, Sekizawa K, Matsui T, Arai H, Sasaki H. Relation between incidence of pneumonia and protective reflexes in post-stroke patients with oral or tube feeding. *J Intern Med* 2000;247(1):39-42.
- Terpenning MS, Taylor GW, Lopatin DE, Kerr CK, Dominguez BL, Loesche WJ. Aspiration pneumonia: dental and oral risk factors in an older veteran population. *J Am Geriatr Soc* 2001;49(5):557-63.
- Finestone HM, Greene-Finestone LS, Wilson ES, Teasell RW. Malnutrition in stroke patients on the rehabilitation service and at follow-up: prevalence and predictors. *Arch Phys Med Rehabil* 1995;76(4):310-6.
- Davalos A, Ricart W, Gonzalez-Huix F, Soler S, Marrugat J, Molins A, et al. Effect of malnutrition after acute stroke on clinical outcome. *Stroke* 1996;27(6):1028-32.
- Gariballa SE, Parker SG, Taub N, Castleden M. Nutritional status of hospitalized acute stroke patients. *Br J Nutr* 1998;79(6):481-7.
- Royal College of Physicians. Intercollegiate Working Party for Stroke. National Clinical Guidelines for Stroke. London: The College; 2000.
- National Professional Standards for Dietitians Practising in Healthcare. British Dietetic Association; 1997. [cited 14 Feb 2003]. Available from url: <http://www.bda.uk.com>
- Nutrition - assessment and referral in the care of adults in hospital. Best Practice Statement. Nursing and Midwifery Practice Development Unit; 2002. [cited 14 Feb 2003]. Available from url: <http://www.nmpdu.org/projects/nutbps.html>
- Cook Z, Kirk S, Lawrenson S, Sandford S. Challenging the use of body mass index (BMI) to assess under-nutrition in older people. *Effective Practice Bulletin, Dietetics Today* 2003;32.
- DePippo KL, Holas MA, Reding MJ, Mandel FS. The Burke Screening Test for Dysphagia: validation of its use in patients with stroke. *Stroke* 1993;24(552):173.
- Splaingard ML, Hutchins B, Sulton LD, Chaudhuri G. Aspiration in rehabilitation patients: videofluoroscopy vs bedside clinical assessment. *Arch Phys Med Rehabil* 1988;69(8):637-40.
- McCullough GH, Wertz RT, Rosenbek JC. Sensitivity and specificity of clinical/bedside examination signs for detecting aspiration in adults subsequent to stroke. *J Commun Disord* 2001;34(1-2):55-72.
- Cherney LR, Cantieri CA, Pannel JJ. Clinical evaluation of dysphagia. Rehabilitation Institute of Chicago procedure manual. Maryland: Aspen Systems Corporation; 1986.
- Kennedy GD. A functional assessment of dysphagia. *Speech Therapy in Practice* 1991(April):27-8.
- Linden P, Kuhlemeier KV, Patterson C. The probability of correctly predicting subglottic penetration from clinical observations. *Dysphagia* 1993;8(3):170-9.
- Logemann JA, Rademaker AW, Pauloski BR, Ohmae Y, Kahrilas PJ. Normal swallowing physiology as viewed by videofluoroscopy and videoendoscopy. *Folia Phoniatr Logop* 1998;50(6):311-9.
- Leder SB, Espinosa JF. Aspiration risk after acute stroke: comparison of clinical examination and fiberoptic endoscopic evaluation of swallowing. *Dysphagia* 2002;17(3):214-8.
- Logemann JA. Evaluation and treatment of swallowing disorders. 2nd ed. Australia: Pro-Ed; 1998.

60. Logemann JA. Manual for the videofluorographic study of swallowing. San Diego: College Hill Press; 1986.
61. Kuhlemeier KV, Yates P, Palmer JB. Intra- and interrater variation in the evaluation of videofluorographic swallowing studies. *Dysphagia* 1998;13(3):142-7.
62. Aviv JE. Prospective, randomized outcome study of endoscopy versus modified barium swallow in patients with dysphagia. *Laryngoscope* 2000;110(4):563-74.
63. Langmore SE, Schatz K, Olson N. Endoscopic and videofluoroscopic evaluations of swallowing and aspiration. *Ann Otol Rhinol Laryngol* 1991;100(8):678-81.
64. Zenner PM, Losinski DS, Mills RH. Using cervical auscultation in the clinical dysphagia examination in long-term care. *Dysphagia* 1995;10(1):27-31.
65. Stroud AE, Lawrie BW, Wiles CM. Inter- and intra-rater reliability of cervical auscultation to detect aspiration in patients with dysphagia. *Clin Rehabil* 2002;16(6):640-5.
66. Zaidi NH, Smith HA, King SC, Park C, O'Neill PA, Connolly MJ. Oxygen desaturation on swallowing as a potential marker of aspiration in acute stroke. *Age Ageing* 1995;24(4):267-70.
67. Colodny N. Effects of age, gender, disease, and multisystem involvement on oxygen saturation levels in dysphagic persons. *Dysphagia* 2001;16(1):48-57.
68. Leder SB. Use of arterial oxygen saturation, heart rate, and blood pressure as indirect objective physiologic markers to predict aspiration. *Dysphagia* 2000;15(4):201-5.
69. Sherman B, Nisenbom JM, Jesberger BL, Morrow CA, Jesberger JA. Assessment of dysphagia with the use of pulse oximetry. *Dysphagia* 1999;14(3):152-6.
70. Rowat AM, Wardlaw JM, Dennis MS, Warlow CP. Does feeding alter arterial oxygen saturation in patients with acute stroke? *Stroke* 2000;31(9):2134-40.
71. Colodny N. Comparison of dysphagics and nondysphagics on pulse oximetry during oral feeding. *Dysphagia* 2000;15(2):68-73.
72. Collins MJ, Bakheit AM. Does pulse oximetry reliably detect aspiration in dysphagic stroke patients? *Stroke* 1997;28(9):1773-5.
73. Roffe C, Sills S, Wilde K, Crome P. Effect of hemiparetic stroke on pulse oximetry readings on the affected side. *Stroke* 2001;32(8):1808-10.
74. Hirst LJ, Ford GA, Gibson GJ, Wilson JA. Swallow-induced alterations in breathing in normal older people. *Dysphagia* 2002;17(2):152-61.
75. Guidelines for screening and management of stroke patients with dysphagia. CODA collaborators; 1997. [cited 14 Feb 2003]. Available from url: <http://www.ncl.ac.uk/stroke-research-unit/coda/coguide.htm>
76. Ramritu P, Finlayson K, Mitchell A, Croft G. Identification and nursing management of dysphagia in individuals with neurological impairment: a systematic review. Adelaide: Joanna Briggs Institute for Evidence Based Nursing and Midwifery; 2000.
77. Perry L. Screening swallowing function of patients with acute stroke. Part one: Identification, implementation and initial evaluation of a screening tool for use by nurses. *J Clin Nurs* 2001;10(4):463-73.
78. Magnus V. Dysphagia training for nurses in an acute hospital setting—a pragmatic approach. *Int J Lang Commun Disord* 2001;36(Suppl):375-8.
79. Davies S, Taylor H, MacDonald A, Barer D. An inter-disciplinary approach to swallowing problems in acute stroke. *Int J Lang Commun Disord* 2001;36(Suppl):357-62.
80. Miller R, Krawczyk K. Dysphagia training programmes: 'Fixes that fail' or effective inter-disciplinary working? *Int J Lang Commun Disord* 2001;36(Suppl):379-84.
81. Badley K, Bignall H. Managing dysphagia. Winchester: Winchester & Eastleigh Healthcare Trust; 1994.
82. Royal College of Speech and Language Therapists. Dysphagia Working Group. Recommendations for pre- and post-registration and advanced level dysphagia education and training. London: The College; 1999. [cited 14 Feb 2003]. Available from url: <http://www.rcslt.org/pdfs/finalrep.doc>
83. The Ionising Radiation (Medical Exposure) Regulations, IR(ME)R. London: HMSO; 2000. (S.I. 1059, 2000). [cited 14 Feb 2003]. Available from url: <http://www.legislation.hms.gov.uk/si/si2000/20001059.htm>
84. McCullough GH, Wertz RT, Rosenbek JC, Mills RH, Webb WG, Ross KB. Inter- and intrajudge reliability for videofluoroscopic swallowing evaluation measures. *Dysphagia* 2001;16(2):110-8.
85. Scott A, Perry A, Bench J. A study of interrater reliability when using videofluoroscopy as an assessment of swallowing. *Dysphagia* 1998;13(4):223-7.
86. Wilcox F, Liss JM, Siegel GM. Interjudge agreement in videofluoroscopic studies of swallowing. *J Speech Hear Res* 1996;39(1):144-52.
87. Rosenbek JC, Robbins JA, Roecker EB, Coyle JL, Wood JL. A penetration-aspiration scale. *Dysphagia* 1996;11(2):93-8.
88. Han TR, Paik NJ, Park JW. Quantifying swallowing function after stroke: a functional dysphagia scale based on videofluoroscopic studies. *Arch Phys Med Rehabil* 2001;82(5):677-82.
89. Professional Standards Board: Invasive procedures guideline. London: Royal College of Speech and Language Therapists; 1999.
90. Gariballa SE, Parker SG, Taub N, Castleden CM. A randomized, controlled, single-blind trial of nutritional supplementation after acute stroke. *J Parenter Enteral Nutr* 1998;22(5):315-9.
91. Bath PMW, Bath FJ, Smithard DG. Interventions for dysphagia in acute stroke (Cochrane Review). In: *The Cochrane Library*, Issue 2, 2002. Chichester, UK: John Wiley & Sons, Ltd.
92. Malthus-Vielgen EM, Tytgat GN, Merkus MP. Feeding tubes in endoscopic and clinical practice: the longer the better. *Gastrointest Endosc* 1993;39:537-42.
93. Crocker KS, Krey SH, Steffee WP. Performance evaluation of a new nasogastric feeding tube. *J Parenter Enteral Nutr* 1981;5(1):80-2.
94. Silk DB, Rees RG, Keohane PP, Attrill H. Clinical efficacy and design changes of "fine bore" nasogastric feeding tubes: a seven-year experience involving 809 intubations in 403 patients. *J Parenter Enteral Nutr* 1987;11(4):378-83.
95. Miller RE, Castlemain B, Lacqua FJ, Kotler DR. Percutaneous gastrostomy. Results in 316 patients and review of literature. *Surg Endosc* 1989;3(4):186-90.
96. Larson DE BD, Schroeder KW, DiMaggio EP. Percutaneous endoscopic gastrostomy. Indications, success, complications, and mortality in 314 consecutive patients. *Gastroenterology* 1987;93(1):48-52.
97. Callahan CM, Haag KM, Weinberger M, Tierney WM, Buchanan NN, Stump TE, et al. Outcomes of percutaneous endoscopic gastrostomy among older adults in a community setting. *J Am Geriatr Soc* 2000;48(9):1048-54.
98. Schurink CA, Tuijnman H, Scholten P, Arjaans W, Klinkenberg-Knol EC, Meuwissen SG, et al. Percutaneous endoscopic gastrostomy: complications and suggestions to avoid them. *Eur J Gastroenterol Hepatol* 2001;13(7):819-23.
99. Finucane TE, Bynum JP. Use of tube feeding to prevent aspiration pneumonia. *Lancet* 1996;348:1421-4.
100. Panos MZ, Reilly H, Moran A, Reilly T, Wallis PJ, Wears R, et al. Percutaneous endoscopic gastrostomy in a general hospital: prospective evaluation of indications, outcome, and randomised comparison of two tube designs. *Gut* 1994;35(11):1551-6.
101. Davies S, Fall S, Ellul Y, Barer D. Dysphagia and nutrition after stroke: should more patients be considered for early percutaneous endoscopic gastrostomy feeding? *Clin Rehabil* 1998;12:162.
102. McFie J. Ethics and nutritional support: A clinician's view. *Clin Nutr* 2001;20(Suppl 1):87-99.
103. Rickman J. Percutaneous endoscopic gastrostomy: psychological effects. *Br J Nurs* 1998;7(12):723-9.
104. Elia M, Stratton RJ, Holden C, Meadows N, Micklewright A, Russell C, et al. Home enteral tube feeding following cerebrovascular accident. *Clin Nutr* 2001;20(1):27-30.
105. Harper JR, McMurdo ME, Robinson A. Rediscovering the joy of food: the need for long-term review of swallowing ability in stroke patients. *Scott Med J* 2001;46(2):54-5.
106. Groher ME, McKaig TN. Dysphagia and dietary levels in skilled nursing facilities. *J Am Geriatr Soc* 1995;43(5):528-32.
107. Wijdicks EF, McMahon MM. Percutaneous endoscopic gastrostomy after acute stroke: complications and outcome. *Cerebrovasc Dis* 1999;9(2):109-11.
108. Russell CA, Rollins H. The needs of patients requiring home enteral tube feeding. *Prof Nurse* 2002;17(8):500-2.
109. McNamara EP, Flood P, Kennedy NP. Home tube feeding: an integrated multidisciplinary approach. *J Hum Nutr Dietetics* 2001;14(1):13-9.
110. Cook IJ, Kahrilas PJ. AGA technical review on management of oropharyngeal dysphagia. *Gastroenterology* 1999;116(2):455-78.
111. Elmstahl S, Bulow M, Ekberg O, Petersson M, Tegner H. Treatment of dysphagia improves nutritional conditions in stroke patients. *Dysphagia* 1999;14(2):61-6.
112. Huckabee ML, Cannito MP. Outcomes of swallowing rehabilitation in chronic brainstem dysphagia: a retrospective evaluation. *Dysphagia* 1999;14:93-109.
113. Klor BM, Militani FJ. Rehabilitation of neurogenic dysphagia with percutaneous endoscopic gastrostomy. *Dysphagia* 1999;14:162-4.
114. Rosenbek JC, Roecker EB, Wood JL, Robbins J. Thermal application reduces the duration of stage transition in dysphagia after stroke. *Dysphagia* 1996;11(4):225-33.
115. British Dietetic Association and the Royal College of Speech and Language Therapists joint document: National Descriptors for Texture Modification in Adults. 2002. [cited 14 Feb 2003]. Available from url: <http://www.bda.uk.com/Downloads/dysphagia.pdf>
116. Clinical Standards: food, fluid and nutritional care in hospitals. Edinburgh: NHS Quality Improvement Scotland; 2003. [cited 1 March 2004]. Available from url: <http://www.nhshealthquality.org>
117. Logemann JA. The dysphagia diagnostic procedure as a treatment efficacy trial. *Clin Commun Disord* 1993;3(4):1-10.
118. Lazarus CL, Logemann JA, Rademaker AW, Kahrilas PJ, Pajak T, Lazar R, et al. Effects of bolus volume, viscosity, and repeated swallows in nonstroke subjects and stroke patients. *Arch Phys Med Rehabil* 1993;74(10):1066-70.
119. Nair BR, Gelfius I. The palatal training appliance. Case reports. *Aust Dent J* 1990;35(5):416-8.
120. Selley WG, Roche MT, Pearce VR, Ellis RE, Flack FC. Dysphagia following strokes: clinical observations of swallowing rehabilitation employing palatal training appliances. *Dysphagia* 1995;10(1):32-5.

121. Park CL, O'Neill PA, Martin DF. A pilot exploratory study of oral electrical stimulation on swallow function following stroke: An innovative technique. *Dysphagia* 1997;12(3):161-6.
122. Reddy NP, Simcox DL, Gupta V, Motta GE, Coppenger J, Das A, et al. Biofeedback therapy using accelerometry for treating dysphagic patients with poor laryngeal elevation: case studies. *J Rehabil Res Dev* 2000;37(3):361-72.
123. Perez I, Smithard DG, Davies H, Kalra L. Pharmacological treatment of dysphagia in stroke. *Dysphagia* 1998;13(1):12-6.
124. Griffiths J, Lewis D. Guidelines for the oral care of patients who are dependent, dysphagic or critically ill. *J Disabil Oral Health* 2002;3(1):30-3.
125. Curzio J, McCowan M. Getting research into practice: developing oral hygiene standards. *Br J Nurs* 2000;9(7):434-8.
126. Thomson FC, Naysmith MR, Lindsay A. Managing drug therapy in patients receiving enteral and parenteral nutrition. *Hosp Pharmacist* 2000;7(6):155-64.
127. O'Loughlin G, Shanley C. Swallowing problems in the nursing home: a novel training response. *Dysphagia* 1998;13(3):172-83.
128. Lipner HS, Bosler J, Giles G. Volunteer participation in feeding residents: training and supervision in a long-term care facility. *Dysphagia* 1990;5(2):89-95.
129. Kohler ES. A dysphagia management model for rural elderly. *Physical and Occupational Therapy in Geriatrics* 1991;10(1):81-95.
130. Laska AC, Hellblom A, Murray V, Kahan T, Von Arbin M. Aphasia in acute stroke and relation to outcome. *J Intern Med* 2001;249(5):413-22.
131. Tilling K, Sterne JA, Rudd AG, Glass TA, Wityk RJ, Wolfe CD. A new method for predicting recovery after stroke. *Stroke* 2001;32(12):2867-73.
132. Wang Y, Lim LL, Levi C, Heller RF, Fischer J. A prognostic index for 30-day mortality after stroke. *J Clin Epidemiol* 2001;54(8):766-73.
133. Barba R, Morin MD, Cemillan C, Delgado C, Domingo J, Del Ser T. Previous and incident dementia as risk factors for mortality in stroke patients. *Stroke* 2002;33(8):1993-8.
134. Adults with Incapacity (Scotland) Act. 2000. [cited 14 Feb 2003]. Available from url: <http://www.hms.gov.uk>
135. Parr S, Pound C, Byng S, Long B. *The Aphasia Handbook*. London: Connect Press; 1999.
136. Kayser-Jones J. Mealtime in nursing homes: the importance of individualized care. *J Gerontol Nurs* 1996;22(3):26-31.
137. Moore K. Stroke: the long road back. *RN* 1994;57(3):50-5.
138. Nease RF, Owens DK. A method for estimating the cost-effectiveness of incorporating patient preferences into practice guidelines. *Med Decis Making* 1994;14(4):382-92.
139. O'Connor AM, Stacey D, Rovner D, Holmes-Rovner M, Tetroe J, Llewellyn-Thomas H, et al. Decision aids for people facing health treatment or screening decisions (Cochrane Review). In: *The Cochrane Library*, Issue 4, 2001. Chichester, UK: John Wiley & Sons, Ltd.
140. Barnes G, Lee F. Coordinating and planning services for stroke patients in hospital and the community. *Br J Occup Ther* 1995;58(4):158-60.
141. Carod-Artal F. Measurement of the quality of life in stroke survivors. *Rev Neurol* 1999;29(5):447-56.
142. Church R. Living happily ever after. *J Care Pract* 1994;3(2):52-60.
143. Exall K, Johnston H. Caring for carers coping with stroke. *Nurs Times* 1999:50-1.
144. Gabe-Skabowski M, Archini S, Bedinger K, Suzuki A. The home care team approach to dysphagia. *Caring* 1990;9(10):66-9.
145. Gardner PJ. Health education. Creative food tips and dysphagia. *Home Care Provid* 2000;5(6):204-5.
146. Hayn MA, Fisher TR. Stroke rehabilitation: salvaging ability after the storm. *Nursing (Lond)* 1997;27(3):40-6.
147. Hollinghurst V. The prisoner. *Nurs Times* 1998:28.
148. Hufler DR. Helping your dysphagic patient eat. *RN* 1987;50(9):36-8.
149. Pound P, Tilling K, Rudd AG, Wolfe CD. Does patient satisfaction reflect differences in care received after stroke? *Stroke* 1999;30(1):49-55.
150. Terrado M, Russell C, Bowman JB. Dysphagia: an overview. *Medsurg Nurs* 2001;10(5):233-50.
151. People's experiences of NHSScotland: a survey of people who have had a stroke and the carers of those who have had a stroke. Edinburgh: Clinical Standards Board for Scotland; 2002. [cited 14 Feb 2003]. Available from url: <http://www.nhshealthquality.org>
152. McHorney CA, Robbins J, Lomax K, Rosenbek JC, Chignell K, Kramer AE, et al. The SWAL-QOL and SWAL-CARE outcomes tool for oropharyngeal dysphagia in adults: III. Documentation of reliability and validity. *Dysphagia* 2002;17(2):97-114.
153. Palmer JB, Kuhlemeier KV, Tippett DC, Lynch C. A protocol for the videofluorographic swallowing study. *Dysphagia* 1993;8(3):209-14.
154. Mackel J. Tube Feeding - Making the Decision. *Complete Nutrition*, 2004;4(4):13-5.

ASSESSMENT

- A standardised clinical bedside assessment (CBA) should be used by a professional skilled in the management of dysphagia
- The CBA developed and tested by Logemann, or a similar tool, is recommended.

C The modified barium swallow (MBS) test and fiberoptic endoscopic evaluation (FEES) of swallow are both valid methods for assessing dysphagia. The clinician should consider which is the most appropriate for different patients in different settings.

D Hospital and community pharmacists or medicines information centres should be consulted on the most appropriate method of administering medication.

DIET MODIFICATION

D Advice on diet modification and compensatory techniques (postures and manoeuvres) should be given following full swallowing assessment

- Texture modified food should be attractively presented and appetising. Patients should have a choice of dishes.

D Texture modified meals may be fortified to enable patients to meet nutritional requirements

- Food and fluid intake should be monitored and, if indicated, a referral made to the dietitian.

ROLE OF REGULAR REVIEW

D Patients with persistent dysphagia should be reviewed regularly, at a frequency related to their individual swallowing function and dietary intake, by a professional skilled in the management of dysphagia.

Measurement of weight should continue after discharge, particularly in older stroke patients.

Ongoing support from health professionals after initiating feeding is essential and there should be an infrastructure to support enterally fed patients in all settings

- A named professional, made known to the patient and carers, should have specific responsibility for the management of anyone discharged on PEG or NG feeding. This should also be considered for anyone on a modified diet.

ORAL HYGIENE

D Good oral hygiene should be maintained in patients with dysphagia, particularly in those with PEG or NG tubes, in order to promote oral health and patient comfort.

An appropriate oral care protocol should be used for every patient with dysphagia, including those who use dentures.

CARING FOR PATIENTS WITH DYSPHAGIA

D Staff, carers and patients should be trained in feeding techniques. This training should include:

- modifications of positioning and diet
- food placement
- management of behavioural and environmental factors
- delivery of oral care
- management of choking.

SOURCES OF USEFUL INFORMATION

British Association for Parenteral and Enteral Nutrition

Website: www.bapen.org.uk

Chest, Heart & Stroke Scotland

65 North Castle Street, Edinburgh EH2 3LT

Advice Line: 0845 077 6000

Tel 0131 225 6963 • Fax 0131 220 6313

Email: admin@chss.org.uk • Website: www.chss.org.uk

Carers Scotland

91 Mitchell Street, Glasgow G1 3LN

Tel: 0141 221 9141 • CarersLine: Freephone 0808 808 7777

(Wed -Thur 10am - noon and 2 pm - 4 pm)

Different Strokes

9 Canon Harnett Court, Wolverton Mill,

Milton Keynes, MK12 5NF

Tel: 0845 130 7172 • Fax: 01908 313501

Email: info@differentstrokes.co.uk

Website: www.differentstrokes.co.uk

Moving Into Work

Norton Park, 57 Albion Road, Edinburgh EH7 5QY

Tel: 0131 475 2600 • Fax: 0131 475 2379

Email: moving@intowork.org.uk

Website www.intowork.org.uk/moving

Princess Royal Trust for Carers

Campbell House,

215 West Campbell Street, Glasgow G2 4TT

Tel: 0141 221 5066 • Fax: 0141 221 4623

Email: infoscotland@carers.org • Website: www.carers.org

Speakability

1 Royal Street, London SE1 7LL

Tel: 020 7261 9572 • Fax: 020 7928 9542

Helpline: Freephone 080 8808 9572 (Mon - Fri, 10 am - 4 pm)

Email: speakability@speakability.org.uk

Website www.speakability.org.uk

EVALUATING SWALLOWING & NUTRITION AFTER STROKE

Dysphagia affects a large proportion of stroke patients. Swallowing difficulties can result in aspiration and reduced oral intake, leading to the potentially serious complications of pneumonia, undernutrition and dehydration.

C All stroke patients should be screened for dysphagia before being given food or drink.

ASPIRATION PNEUMONIA

B The water swallow test should be used as part of the screening for aspiration risk in stroke patients.

C Clinical history taking should take into account comorbidities and other risk factors (eg smoking, respiratory disease) to identify increased risk of developing aspiration pneumonia.

SWALLOW SCREENING

D Patients with dysphagia should be monitored daily in the first week to identify rapid recovery. Observations should be recorded as part of the care plan.

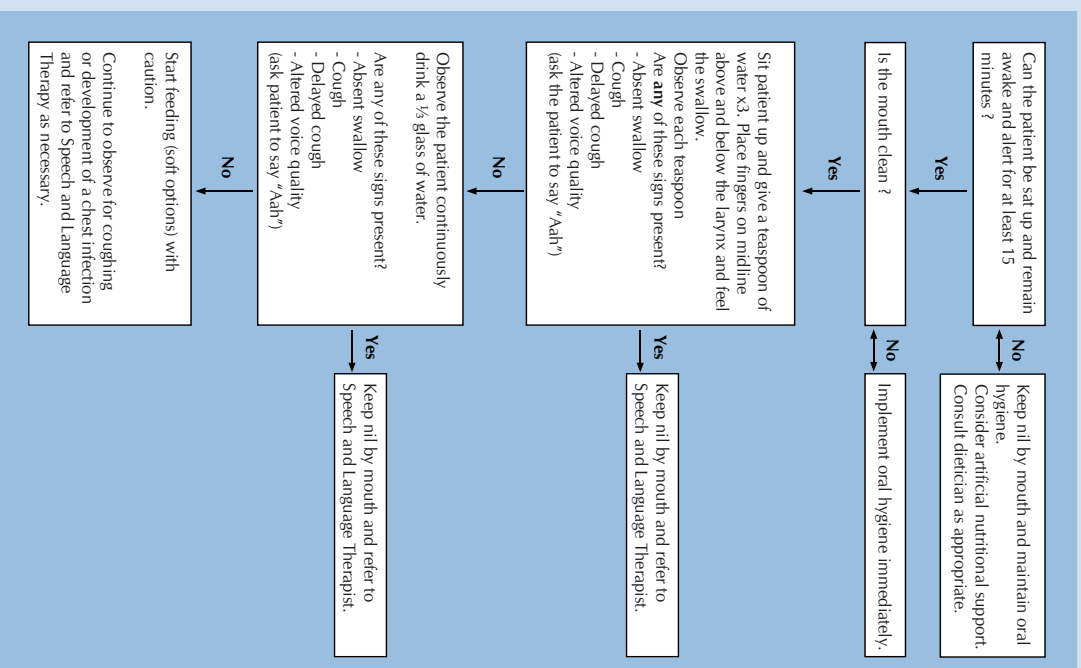
Patients not fit for assessment should be screened daily to avoid delay in referral for full clinical assessment.

B A typical swallow screening procedure should include:

- initial observations of the patient's consciousness level
 - observations of the degree of postural control
- If the patient is able to actively cooperate and is able to be supported in an upright position the procedure should also include:
- observations of oral hygiene
 - observations of control of oral secretions
 - if appropriate, a water swallow test.

Patients on nil by mouth or modified diet should continue to receive clinically essential medication by an appropriate route as advised by a pharmacist.

EXAMPLE SWALLOW SCREEN



UNDERNUTRITION

Early and sequential screening for nutritional risk is needed to permit appropriate nutritional intervention.

NUTRITIONAL SCREENING

D Nutritional risk should be established using a valid and reliable screening procedure suitable for stroke patients and should be repeated at regular intervals throughout the episode of care.

- Nutritional screening should focus on the effects of the stroke on nutritional status (eg presence of dysphagia and ability to eat) rather than previous nutritional status
- Nutritional risk should be established within 48 hours of admission to hospital
- Nutritional screen results should guide appropriate referral to a dietitian for assessment and management.

D Nutritional screening should cover: body mass index (BMI), ability to eat, appetite, physical condition, mental condition.

NUTRITIONAL INTERVENTIONS

Patients with dysphagia who are unable to meet their nutritional requirements orally should be considered for initial NG feeding as soon as possible, within one week of onset. This decision should be made by the multidisciplinary team in consultation with the patient and their carers/family.

D Patients in the early recovery phase should be reviewed weekly by the multidisciplinary team to ascertain if longer term (> 4 weeks) feeding is required.

B Feeding via percutaneous endoscopic gastrostomy (PEG) is the recommended feeding route for long term (> 4 weeks) enteral feeding. Patients requiring long term tube feeding should be reviewed regularly.

The decision to place a PEG should balance the risks and benefits and take into consideration individual patient needs. Patients should also be given the opportunity to decide whether they want to go ahead with a procedure.

D Patient's and carer's perceptions and expectations of PEG feeding should be taken into account and the benefits, risks and burden of care fully explained before initiating feeding.