



# **RCSLT RESOURCE MANUAL FOR COMMISSIONING AND PLANNING SERVICES FOR SLCN**

Dysphagia

## Dysphagia

### 1. Key Points

1. Speech and language therapists have a unique HPC registered role in identifying and managing oropharyngeal dysphagia associated with a broad range of developmental, neurological and head and neck disorders. The key role of the speech and language therapist in the assessment, differential diagnosis and management of dysphagia has been recognised in national and international guidelines of practice.
2. There is evidence that the appropriate identification and management of dysphagia by speech and language therapists reduces morbidity, mortality and improves the quality of life.
3. Improved nutrition and hydration have an impact on physical and mental well-being.
4. Speech and language therapists should be integral members of services and multiagency teams supporting people with dysphagia, their families and carers, and informing the broader clinical management.
5. Children and adults with dysphagia may present in different ways and have varying symptoms and profiles of retained abilities. Services should be person-centred and provide a range of interventions which are culturally appropriate.
6. Instrumental investigations, such as videofluoroscopy and fibre-optic endoscopic evaluation (FEES) are used to visualise the anatomy and physiology of the swallowing mechanism by speech and language therapists. This can improve the accuracy of identifying the nature of dysphagia. These investigations enable the trial of techniques or modification of textures to minimise the risk of complications associated with dysphagia.
7. There is evidence that behavioural approaches used by speech and language therapists in the treatment of dysphagia are effective.
8. The speech and language therapist has a key role in assisting patients to make informed decisions when balancing the risks and benefits of treatment options.
9. Speech and language therapists have a key role in educating/training others in identifying, assessing and managing dysphagia.
10. Persons with long-term conditions, who have transient, intermittent, persistent or progressive dysphagia often remain at risk of the complications associated with dysphagia and require the speech and language therapist to monitor and review progress over time.
11. The appropriate management of dysphagia can reduce complications and length of stay in hospital
12. The specialist skills of the speech and language therapists working with people with dysphagia must be appropriate for the requirements of the job, tasks undertaken, and the supervision available.

Pathways of care for persons with dysphagia should integrate speech and language therapy and take account of the changing needs and focus of interventions as the condition alters or declines.

## 2. What is dysphagia?

Dysphagia is the term used to describe a swallowing disorder usually resulting from a neurological or physical impairment of the oral, pharyngeal or oesophageal mechanisms. The normal swallow has 4 phases:

1. oral preparatory
2. oral
3. oropharyngeal
4. oesophageal

The first three of these together are termed the oropharyngeal phase. The 'normal' swallow needs the respiratory, oral, pharyngeal, laryngeal and oesophageal anatomical structures to function in synchrony, which is dependent upon the motor and sensory nervous system being intact. Disorders of swallowing are associated with increased morbidity, mortality and reduced quality of life. Pneumonia is a common sequela of dysphagia and is associated with higher costs of care (Katzan et al 2007) The involvement of speech and language therapists in the assessment and management of those with dysphagia is associated with better outcomes and advocated within national guidelines e.g. Scottish Intercollegiate Guidelines Network (SIGN 78 and 90), Royal College of Physicians 2008.

## 3. How many people have dysphagia?

The prevalence of dysphagia varies with the aetiology and age of the individual. For some populations It is difficult to ascertain the prevalence rate because of the way dysphagia is reported, often forming part of other health conditions for which the patient is being treated. Dysphagia can be a transient, persistent or deteriorating symptom according to the underlying pathology.

Table1:

Client group	Incidence/Prevalence of condition	Incidence/Prevalence of dysphagia within condition
Cerebral Palsy	Sucking (57%) and swallowing (38%) problems in the first 12 months of life were common, and 80% had been fed nonorally on at least one occasion. S.Reilly, D.Skuse, XPoblete 1996	99% of children with severe cerebral palsy have dysphagia (Calis et al 2008)
Stroke	Each year in England, approximately 110,000 people have a first or recurrent stroke	More than 900,000 people in England are living with the effects of stroke, with half of

Client group	Incidence/Prevalence of condition	Incidence/Prevalence of dysphagia within condition
	and a further 20,000 people have a TIA. NICE 2008. Up to 78% have dysphagia immediately post stroke(Martino et al 2005)	these being dependent on other people for help with everyday activities (NICE 2008). Of all the those with initial dysphagia following stroke 76% will remain with a moderate to severe dysphagia and 15% profound (Mann et al 1999)
Progressive neurological disease	Dysphagia can be an initial symptom in a small number of people with progressive diseases such as Parkinson's disease, multiple sclerosis and motor neurone disease, but the majority will develop dysphagia with progression of the disease	200/100,000 UK population have dysphagia due to Parkinson's disease (Hartelius and Svensson 1994). More than 90% of those with motor neurone disease will develop dysphagia
Chronic Obstructive Pulmonary Disease		27% of those with COPD (McKinstry et al 2009)
Dementia		68% of those with dementia in homes for the aged have dysphagia (Steele 1997)
Adult Learning Disability		5.27% of all adults with a learning disability were referred for advice regarding dysphagia (Chadwick et 2003)
Nursing home residents		Between 50 and 75% of nursing home residents (O'Loughlin & Shanley 1998)
Acute hospitalised elderly		10% of acutely hospitalised elderly. (Lugger 1994)

Dysphagia is now recognised as a symptom of concern in many other conditions such as COPD (McKinstry et al 2009), head and neck cancer (McCabe et al 2009), thermal Burn injury (Ward et al 2001) and acquired brain injury (Ward et al 2007). A study of those having cervical discectomy and fusion indicated an incidence of dysphagia of 48% pre-

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operatively; and 67% post-operatively in those with a previously normal swallow study (Frempong-Boadu et al, 2002). A study by Langmore et al (2002) examining elderly institutionalised individuals concluded that the prevalence of dysphagia and aspiration pneumonia was high being associated with impairment of oral structure, the respiratory or neurological system.

#### 4. What causes dysphagia?

Oropharyngeal dysphagia can result from a number of factors. The causes may be:

- Neurological – including central nervous system, anterior horn cell, peripheral nervous system, neuromuscular junction
- Physical - related to head and neck impairments or surgery-e.g., glossectomy
- Respiratory
- Psychological

In both children and adults dysphagia can present as acute or chronic, and within these categories, static or progressive in its presentation. It is frequently associated with the following disorders:

- Stroke
  - Head/neck cancer
  - Acquired Brain injury
  - Brain or CNS Cancer
  - Respiratory conditions (including COPD or post polio syndromes)
  - Following cervical spinal surgery
  - Progressive neurological diseases, including Multiple Sclerosis, Parkinson's Disease and Dementia
  - Developmental disorder (carried on into adulthood)
- (Crary & Groher, 2003)

The ability to swallow normally can be influenced by a number of factors which can include coordination and strength of the musculature, posture, bolus size, texture of bolus, disuse of swallow due to illness, ageing, cognition, respiratory, and cardiac problems.

#### 5. How does Dysphagia affect individuals?

The intake of adequate food and drink is essential for life. Difficulty with swallowing normally not only has potentially life threatening consequences, but also can lead to an impaired quality of life. This may be due to embarrassment and lack of enjoyment of food, which can have profound social consequences. Aspiration of food, drink and saliva is frequently caused by oropharyngeal dysphagia and can lead to aspiration pneumonia.

Dysphagia can present in many ways, and the patient may demonstrate one or several of the following symptoms:

- |                                       |                               |
|---------------------------------------|-------------------------------|
| • Food spillage from lips             | • Food sticking in the throat |
| • Taking a long time to finish a meal | • Poor oral hygiene           |
| • Dry mouth                           | • Coughing and choking        |
| • Drooling                            | • Regurgitation               |
| • Nasal regurgitation                 | • Weight loss                 |

If untreated, dysphagia can lead to further problems including:

- Problems with physical and brain growth in children
- Choking
- Dehydration
- Malnutrition
- Aspiration Pneumonia
- Asphyxiation
- Chronic pain
- Adverse socioemotional effects
- Death

### **Children**

In children there are serious implications for both survival and brain development if nutrition is insufficient for developmental needs. (Boyle, 1991) There is increasing awareness of compromised swallowing in preterm babies. Respiratory disorders caused by aspiration can seriously affect the child's ability to survive or thrive. In addition, pressure on the caregiver to provide sufficient nutrition and intake for weight gain can cause anxiety and give rise to stress around feeding (Arvedson & Lefton-Greif, 1994). There is particular need to give support to families of children who are the tube fed (Sullivan 2005). Early in life it is important to develop systems to have a pleasant feeding/meal time, to establish a good carer-child relationship. Stressful feeding and meal times can impact on wellbeing, social interaction and lead to behavioural issues. Children can become food refusers and power struggles around food can ensue (Arvedson et al, 1998).

### **Adults**

Pneumonia is a major cause of morbidity and mortality after stroke that can be associated with dysphagia. Sellars et al (2007) in a study of 412 patients determined the key characteristics that would predict patients at high risk for poststroke pneumonia. They concluded that it was associated with, older age, dysarthria, severity of post stroke disability and an abnormal water swallow test.

Furthermore aspiration pneumonia is a leading cause of death in nursing homes. It has been reported that between 35-85% of people are malnourished in longstay institutions such as nursing and residential homes. A study by Langmore et al (2002) examining elderly institutionalised individuals concluded that the prevalence of aspiration pneumonia was associated with COPD, CHF, tube feeding, high dependency, delirium, urinary tract infections, dependence for eating, immobility and number of medications.

As well as being an alarming symptom, swallowing difficulties in the elderly lead to physical and psychosocial problems which may reduce quality of life. Tibbling & Gustafsson (1991) found that elderly patients with dysphagia had significantly more frequent chest pain, heartburn and regurgitation than those without dysphagia. Difficulty with swallowing also caused anxiety at mealtimes; either the individual not wanting to eat alone for fear of choking, or feeling embarrassed at their slow and unusual eating behaviour (Costa Bandeira et al, 2008). In elderly patients swallowing problems can confound existing problems such as diabetes and wound healing (Carrau and Murray, 1998). Guidelines for the management of stroke produced by the Royal College of Physicians (2008) require the early diagnosis and effective management of dysphagia stating that it has been found to reduce the incidence of pneumonia and improve quality of care and outcomes.

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There are cost implications associated with dysphagia. Length of stay in hospital is longer for those stroke patients with dysphagia compared with patients without dysphagia and patients with dysphagia were twice as likely to be discharged to a nursing home than those without. (Odderson et al 1995)

“When a person is unable to swallow, the ability to enjoy almost all other aspects of life is affected. Even minor, intermittent dysphagia can lead to psychological and social stresses. Episodes of choking can lead to a fear of eating that can lead to malnutrition and social withdrawal.” (McCulloch et al, in Perlman and Schulze-Delrieu 1997)

### **6. What are the aims/objectives of speech and Language therapy interventions for dysphagia?**

Speech and language therapists are core members of the multidisciplinary team managing children and adults with oropharyngeal dysphagia. They have a unique role for the assessment, diagnosis and management of oropharyngeal dysphagia. The aims and objectives of speech and language therapy interventions for dysphagia depend on the type and nature of the dysphagia, the underlying cause, and the needs and preferences of the individual. Considering the safety of the swallow, managing aspiration and preventing complications are of paramount concern. In children the aims and objectives will change as appropriate to the age as the child's anatomy and neurological abilities alter with growth and development (Logemann, 1998).

The overall aims of the speech and language therapist working with an individual with dysphagia include:

- detailed and accurate assessment (there may be multiple assessments over time) leading to accurate diagnosis of dysphagia which may assist with the differential medical diagnosis
- ensuring safety (reducing or preventing aspiration) with regards to swallowing function
- balancing these factors with quality of life
- taking account of the individual's preferences and beliefs
- working with other members of the team to optimise nutrition and hydration

In order to achieve this, the SLT will take a full case history and conduct clinical and instrumental assessments. Screening of swallowing is often undertaken by other professionals trained by speech and language therapists. SLTs may also use these screening assessments, bedside clinical examinations, and, if indicated, use more detailed formal assessments (e.g. Northwestern Dysphagia Screening Check Sheet Logemann et al, 1999).

The SLT can use instrumental dysphagia assessments such as videofluoroscopy (dynamic x-ray) or fibre-optic endoscopic evaluation (FEES) to visualise some or all of the three swallow stages (FEES only visualises the pharyngeal phase). These examinations allow inspection of the anatomy and physiology of swallowing and assist in determining the presence/cause of aspiration, and presence/cause of pooling or residue. They facilitate diagnosis, help identify strategies to improve the swallow efficiency and to provide a benchmark for outcomes.

These investigations will allow the SLT to determine the management of the appropriate eating/feeding regimes. SLTs will provide the education and training for those responsible for

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providing the nutrition, hydration and at mealtimes support (family, professionals, relevant others) and maintain links with the multi-disciplinary team to ensure good communication. They are often the key worker for coordinating this activity.

( Logemann, 1998).

The SLT is pivotal in the team supporting long-term management of those with dysphagia associated with a long-term chronic condition. There is evidence that some individuals discharged with a percutaneous endoscopic gastrostomy (PEG) tube can have these removed once swallowing reflexes and ability improve. The speech and language therapist has a role in monitoring progress. Appropriate insertion or removal of PEGs is associated with improved quality of life and reduced costs.

The skill level of the speech and language therapist working with people with dysphagia must be commensurate with the job requirements. Postgraduate training and clinical expertise are required for specialist posts. The complexity of the assessment, diagnosis and management of dysphagia is illustrated in table 2 which uses the International Classification of Functioning.

Table 2: International Classification of Functioning (ICF) dimension and focus of speech and language therapy assessment

<b>ICF dimension</b>	<b>Factors</b>
<b>Impairment</b>	general motor skills structure vocal tract function respiratory status tracheostomy status cognitive levels level of alertness effect of medication oral hygiene oral sensitivity dental health
<b>Activity</b>	nutrition and hydration management of secretions dietary preferences current feeding pattern positioning posture bolus size altered food consistencies pacing and presentation of food and drink need to use special utensils coping strategies
<b>Participation</b>	environment mealtime interaction ability to participate in social meal times ability to eat in different locations cope in differing social settings
<b>Well-being</b>	effects of emotional state, mood and behaviour

## 7. What is the management for people with dysphagia?

As a core member of the multi disciplinary team, speech and language therapists will play a key role in contributing to the early diagnosis of individuals with dysphagia and identifying the specific level of impairment providing appropriate intervention and information for those individuals with dysphagia, their family and carers.

The role of the multi-disciplinary team working with those who have swallowing disorders to include:

- Development of co-ordinated assessment protocols, joint goals and timely intervention
- Joint treatment plans with written documentation
- Multi-disciplinary audit of practice
- Common approach in involvement of patients/relatives/carers

Speech and language therapists are generally involved in environmental modifications, safe swallowing advice, appropriate dietary modification, and the application of swallowing strategies, which improve the efficiency of swallow function and reduce the risk of aspiration. They commonly provide advice and strategies to:

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- Modify consistency of food.
- Modify consistency of fluids.
- Modify feeding.
- Indirectly modify swallow.
- Modifying the physiology of the swallow mechanism during swallowing.
- Modify posture.
- Modify oral sensation.
- Improve oral hygiene
- Strategies to increase confidence and reduce fear of choking

((Crary & Groher, 2003. Costa-Bandeira et al, 2008)

Many persons with dysphagia (particularly those with cognitive problems) may be unaware that they have a swallowing problem, thus carers have to take responsibility for following the recommendations of the speech and language therapist. Educating carers involved in the care of patients with dysphagia is essential in ensuring compliance with safety recommendations made by the speech and language therapist. Lack of information and appropriate supervision are common reasons for non-compliance with safe swallowing strategies. Studies have indicated that the guidance given by speech and language therapists can greatly improve adherence to swallowing regimes (Rosenvinge & Starke, 2005)

There are time implications for the education and training that SLT's provide to other professionals and family members. Working as part of a multidisciplinary team necessitates taking on team roles such as attending care planning meetings etc, which also have time implications.

**Cultural diversity**

Many individuals who have English as a second language, or are from a culture which have particular beliefs and customs associated with eating, will require specialist and sensitive consideration by the speech and language therapist. These individuals may have more difficulty in accessing services and co-operating fully in detailing their symptoms and participating in an assessment. An interpreter may be required to assist the SLT's assessment, to ensure it is both accurate and reliable and to facilitate understanding of therapy and implementation of treatment strategies. There is a time and cost implication when working with interpreters/co-workers, for example, in taking a case history, completing a full assessment in all languages spoken by the individual (if appropriate) and their family. Timings of assessments and mealtimes need to be culturally sensitive, for example, not offering appointment times which coincide with religious observations (Communicating Quality 3, 2006).

## 8. What is the evidence for Speech and language therapy interventions in dysphagia?

**Literature Synthesis****Studies**

This synthesis draws together the evidence from twenty studies on patients with dysphagia or swallowing difficulties. Please refer to the methodology of the literature synthesis, which is detailed in the introductory chapter and provides details of how the qualitative terms 'good' and 'excellent' are applied to the studies described below. All of the studies were published in English, with the



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earliest being published in 1998. Seven of the studies were conducted in the UK, four in America, two in Australia, one in Italy, and one in Turkey. The remaining five studies synthesised results from studies worldwide; three systematic reviews and two literature reviews. The studies investigated from six to 711 patients. The studies investigated different treatment options for dysphagia, methods for assessing dysphagia, the clinical progression of dysphagia within specific conditions, and the impact that dysphagia can have on an individual's quality of life. The literature described here is presented more than once in different groupings, to assist the user in responding to particular enquiries. Thus, they are sorted by condition, and separately by intervention type. The different treatments covered in this synthesis can be broadly categorised as speech and language therapy interventions, diet modification and pharmacological interventions. The papers cover dysphagia occurring following surgery, a stroke or a traumatic brain injury and as a symptom of Parkinson's disease, Huntington's disease, Dementia and Cerebral Palsy. Two of the studies investigated the clinical progression of dysphagia in children, one with traumatic brain injury and the other following surgery for posterior tumour.

### Study Quality

Four of the studies were systematic reviews of excellent quality. Five of the studies were randomised controlled trials (RCTs). Two of the RCTs were of excellent quality. The other three RCT were pilot studies that followed the RCT methodology well but only investigated very small sample sizes.

Two of the studies were good quality clinical trials. The other treatment studies were cohort studies, a case series, a prospective study, a comparison, and an interventional study. These studies were generally of average to good quality. The common problems with these studies were the use of small convenience samples, possible confounding factors, and no comparison group.

It is worth noting that the findings from the non-UK papers need to be interpreted cautiously due to generalisability of findings to the UK population.

Additionally, it is worth noting that studies published prior to 1998 need to be interpreted cautiously due to the generalisability of findings to today's population.

### Studies involving adults with dysphagia

#### Stroke

Dysphagia is a common complication in patients who have experienced a stroke. Eight of the included studies investigated interventions for patients with dysphagia following a stroke. Two of the papers were excellent systematic reviews. Three of the studies were RCTs, one a large good quality one and two pilot RCTs that investigated only 20 and 17 patients. The studies investigated a variety of different treatments and a literature review considered the different methods for assessing dysphagia in stroke patients.

An excellent Cochrane systematic review (Bath, Bath-Hextall, & Smithard 1999), completed in 1999, investigated the effectiveness of different interventions for treating dysphagia in acute stroke patients. The study identified six small RCTs on the effectiveness of percutaneous endoscopic

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gastronomy (PEG) versus nasogastric tube (NGT) feeding (two trials), swallowing therapy (one trial), nutritional supplementation (one trial), fluid supplementation (one trial), and drug therapy (one trial). The results of the two trials on PEG versus NGT feeding found that PEG feeding was associated with fewer deaths and treatment failures. The trial that investigated formal swallowing therapy found that it did not significantly reduce dysphagia when compared with standard treatment. Nutritional supplementation, fluid supplementation and drug therapy with nifedipine were ineffective in the treatment of dysphagia. The authors concluded that too few studies with only small samples of patients have been performed to allow any definite recommendations to be drawn up on the management of dysphagia in acute stroke patients.

Another good systematic review (Foley et al, 2008), completed in 2008, reviewed the evidence for different treatments for dysphagia in patients who had suffered a stroke. The review identified RCTs published from 1966 to August 2007 that examined the efficacy of therapies for dysphagia following stroke. The review included 15 studies covering a broad range of therapies including texture-modified diets, general dysphagia therapy programmes, non-oral feeding, medications, and physical and olfactory stimulation. Dietary texture modification was evaluated in 4 studies, general dysphagia therapy programmes in two studies and enteral feeding in three studies; these are all well-established interventions used in clinical practice. The review was limited to RCT evidence; however, the quality of the trials was generally only fair. Three RCTs investigated the outcomes of acute stroke treated with NG or PEG feeding. The results from these studies suggest that NG feeding is not associated with a higher risk of death when compared with PEG feeding as found previously. Two of the RCTs investigated the effectiveness of general swallowing treatment programmes. Such programmes are recommended and administered by speech-language pathologists. The overall evidence suggested that swallowing treatment programmes are associated with a reduced risk of pneumonia during the acute stage of stroke. Four RCTs investigated the effectiveness of dietary texture modifications and/or alteration of fluid viscosity. Modifications in dietary textures are a common treatment for dysphagia; however, the evidence for their clinical effectiveness is limited. There was limited evidence for all other interventions reviewed. The review was limited by the small number of RCTs conducted on treatments for dysphagia post stroke. Additionally, it was not possible to combine the results quantitatively from multiple studies due to the differences between the outcomes assessed and the treatments evaluated. Nine years on from the Cochrane systematic review there is still a lack of good quality studies investigating the management of dysphagia in stroke patients.

One study included in the review described above, gives information worthy of more detailed inspection. It is a good quality RCT (Carnaby, Hankey & Pizzi, 2006), conducted in Australia, which included 306 patients randomly assigned to three parallel groups. The study compared usual care, which consisted of existing speech and language therapy services, with low intensity swallow therapy which used video fluoroscopy (VFS) to identify treatment strategies and dietary modification (three times per week for one month) with high intensity swallow therapy which again used VFS to identify treatment strategies and dietary modification. Input in this third group was of high intensity (five times per week for one month). The results indicated that there was a consistent but non-significant trend for outcome of normal diet of those treated with increased intensity of specific behavioural therapies indicated by VFS. There was a statistically significant trend for positive outcome of functional swallow and a reduction of chest infection and other complications for those treated with increased intensity of specific behavioural therapies as determined by video fluoroscopy. A pilot RCT (Sullivan & Dangerfield, 2002), conducted in the UK, investigated the impact of direct and indirect speech language therapy on patients who had suffered a stroke. Twenty patients were randomised to either the comparison or experimental group. The comparison

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group received a direct speech and language therapy intervention 3 times a week in addition to daily indirect-trained nurse management. The experimental group received indirect management via trained nursing staff responsible for their day-to-day management. Trained nursing staff were defined as any member of the multidisciplinary team who had attended dysphagia screening and management training sessions carried out by a speech and language therapist. Subjects were reviewed fortnightly by a speech and language therapist unless nursing staff requested an earlier reassessment. The three outcomes investigated in this trial were the time for subjects to return to functional swallow, the number of chest infections and weight loss. The average time for the comparison group to achieve a functional swallow was 32 days and for the experimental group 25 days. One subject in the comparison group had a chest infection. The outcome of weight loss could not be used as not all subjects were measured for weight loss. Whilst the results from the pilot RCT were inconclusive they suggest the importance of a multidisciplinary team in dysphagia management and the important role for speech and language therapists in training members of the team. A further large RCT in this area would be beneficial.

Another pilot RCT (Perez et al, 1998), detailed in the Cochrane review described above, and conducted in the UK, investigated the effect of slow-release nifedipine on patients with persistent dysphagia following a stroke. The study investigated 17 hospitalised patients with persistent, but not severe, dysphagia. Eight of the patients received the treatment of slow-release nifedipine and 9 received a placebo for 4 weeks. All patients were assessed by an experienced speech and language therapist and received speech and language therapy and other treatment following existing practices on the unit. By the end of 4 weeks speech and language therapy assessments showed that 9 patients had improved their swallow, 5 in the treatment and 4 in the placebo group. Patients in the treatment group also experienced significant improvements in their pharyngeal transit times and swallowing delay. The placebo group did not experience the same changes. The results from this small pilot RCT suggests that treatment with pharmacological agents such as nifedipine could have a role in the management of persistent, but not severe, dysphagia following stroke.

A small UK comparison study (Lucas & Rodgers, 1998) compared the dysphagia management of stroke patients in two hospitals with differing speech and language therapists involvement in dysphagia services. At hospital A there was a speech and language therapy dysphagia service for in-patients. Hospital B had extra-contractual referral (ECR) for dysphagia assessment by speech and language therapists from another hospital. At hospital A there was better identification of dysphagia, more complete documentation of nutrition and hydration management, less risky dysphagia management, and less perceived need for chest physiotherapy when compared with hospital B. The findings from this study provide additional support for the role of speech and language therapists in dysphagia services.

A small cohort study (Finestone et, 2001), conducted in America, investigated whether stroke patients with dysphagia met their estimated fluid recommendations when receiving an oral or non-oral diet. The oral diet consisted of a thickened-fluid dysphagia diet and the non-oral diet was enteral feeding supplemented with intravenous fluids. The thirteen patients were studied for 21 days after they were admitted to hospital. Seven of the patients were started on non-oral feeding progressing to oral diets and 6 of the patients received just the oral dysphagia diet. The dysphagic stroke patients that received the oral diet did not meet their fluid requirements while patients receiving the non-oral diet did.

A literature review (Ramsey, Smithard, & Kalra, 2003) synthesised evidence from literature worldwide on the various assessment methods used to complete early assessment of dysphagia in

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acute stroke patients and then considered the advantages and disadvantages of the different methods. The study found that the most frequent method used to assess swallowing was the bedside swallow assessment which covered a number of techniques used in a hospital ward. If further assessment is then required videofluoroscopy is usually used. Bedside swallow tests are safe to patients and relatively easy and quick to perform. However, silent aspiration can be missed in some bedside tests and reliability is variable. In terms of assessing swallow mechanics and testing compensatory techniques, videofluoroscopy has advantages over bedside tests. However, the results provided are dependent on following operating procedures correctly and assessors being properly training to interpret the results. Additionally, many acute stroke patients recover from dysphagia within 2-4 weeks after a stroke, thus subjecting these patients to a complicated test may be unnecessary. The study concluded that although bedside tests are a useful early screening tool they are not always completely accurate. The development of more reliable bedside tests would enable a range of professionals to screen patients quickly and easily for swallowing problems to enable patients to be fed appropriately.

A more recent literature review (Speyer et al 2009) used a similar but more rigorous method to that described in the previous paragraph. Whilst most literature that they identified related to dysphagia associated with stroke these authors also included treatment studies of dysphagia caused by other aetiologies. In general, the 59 studies that were included indicated statistically significant positive therapy effects. However the authors caution that for most studies the conclusions could not be generalised and comparison was hindered by the range of aetiologies, types of therapies and evaluation techniques and that many questions remain unanswered.

From these studies there appears to be evidence for swallowing behavioural interventions for treating dysphagia following stroke and the importance of the role of the speech and language therapist is highlighted.

A further point to note relates to the study conducted by Katzan et al (2007) which examined the costs of pneumonia during hospitalisation of patients following stroke, pneumonia being a common sequelae of dysphagia. These authors concluded that if their findings were extrapolated to the 500,000 similar patients hospitalised for stroke in the United States the annual cost of pneumonia was approximately \$459 million.

## Chronic Obstructive Pulmonary Disease

A small prospective study found dysphagia in patients with COPD in an outpatient clinic and established clinical and social benefit from the identification of dysphagia and a focused education programme (Mckinstry et al 2009)

## Parkinson's Disease

Three of the studies investigated interventions for people with Parkinson's disease and associated dysphagia. Two of the studies utilised RCT methodology. The first study was a good quality RCT that investigated a large number of subjects and considered the outcomes for up to three months after the intervention. The second study also followed the RCT methodology; however, it was a pilot RCT and only investigated a small sample and the comparison group was composed of people of a similar age but who did not have Parkinson's disease or dementia. The third study was a clinical trial and investigated a large number of subjects; however, it would have benefited from a longer-term follow-up.

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A good RCT (Robbins et al, 2008), conducted in America, compared the effectiveness of chin-down posture and two consistencies (nectar or honey) of thickened liquids, for frail elderly patients with dysphagia and Parkinson's disease or dementia, on the incidence of pneumonia. The 515 patients aged 50 years or older were patients of 47 hospitals and 79 subacute facilities. Study participants were randomly assigned to drink nectar-thick or honey-thick liquids in a head-neutral position or to drink thin liquid in a chin-down posture. Experienced speech-language pathologists, nurses and direct care and dietary staff supervised the administration of the intervention. The three month cumulative incidence of pneumonia was lower for patients in the chin-down posture group than in the thickened-liquid groups. In the nectar-thick group the pneumonia incidence was lower when compared with the honey-thick group. The overall incidence of pneumonia was much lower than expected in this frail elderly population. From this study no definitive conclusions can be drawn; a further study to investigate the drinking of nectar-thick liquids in the chin-down posture could be beneficial. This study followed a clinical trial by Logemann et al (2008), conducted in America, who investigated 711 patients with Parkinson's Disease or dementia who aspirated on thin liquids. Patients received each of the 3 interventions in a randomly assigned order while been assessed videofluorographically. The three interventions were drinking a thin liquid in the chin-down posture, drinking honey-thickened liquids and drinking nectar-thickened liquids. The study found that aspiration was eliminated most often with honey-thickened liquids, followed by nectar-thickened liquids and then the chin-down posture. For approximately half the patients investigated aspiration was stopped by one or more of the three interventions indicating the importance of assessing each of the interventions to ensure that the best prevention method is selected for each individual patient. Patients with Parkinson's Disease without dementia were also asked about their preference for each intervention. The most popular intervention was chin-down posture followed closely by the nectar-thickened liquids. This study demonstrates that swallow assessment aided by videofluoroscopy can help determine the most appropriate short-term intervention to stop aspiration. It is important to also consider the preferences of each individual patient when determining their treatment plan. This study only considered the short-term prevention of aspiration and the longer-term impact of the interventions could be beneficially assessed

A pilot RCT (Marks et al, 2001) investigated the efficacy of a speech and language therapy intervention compared with botulinum toxin injections to control drooling in patients with Parkinson's Disease. The speech and language therapy included education about drooling, a drooling awareness chart and a portable metronome broach to prompt swallowing. The botulinum toxin injections were injected into both the parotid glands. Following both interventions participants showed a reduction in drooling severity compared with their baseline scores and the scores of an aged matched comparison group. The degree of improvement in controlling drooling was not completely maintained at the three month follow-up. The findings from this study indicate that a speech and language therapy intervention using a behaviour modification programme may help reduce drooling in patients with Parkinson's disease. The intervention is inexpensive in terms of speech and language therapists' time and the equipment required. Additionally, the programme does not require patients to regularly attend the out-patients clinic which would make it easier for patients who find the journey stressful and for their carers. To ensure maximum benefit for patients, speech and language therapists could carefully select patients who appear to have the motivation to complete the exercises at home.

## Huntington's Disease

One excellent systematic review (Bilney, Morris, & Perry, 2003) synthesised the evidence for the effectiveness of physiotherapy, occupational therapy and speech pathology for people over 18

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years old with Huntington's Disease. The review retrieved three articles on speech pathology with two of the articles investigating speech pathology for feeding and swallowing difficulties. The review concluded that there is some evidence that interventions provided by speech pathologists can improve the ability of people with Huntington's Disease to feed independently. Additionally, there is limited evidence that dysphagia can be improved with strategies used by speech pathologists. Methodological flaws in the two studies that addressed eating and swallowing limit the conclusions that may be drawn regarding treatment effectiveness.

## Dementia

Two studies within the same research programme considered the treatment of aspiration in patients with dementia. One of the studies was a good RCT and the other was a clinical trial without a control group. Both of the studies considered the effectiveness of chin-down posture and nectar-thickened liquids or honey-thickened liquids on aspiration in these patients. The RCT considered the three month cumulative incidence of pneumonia while the clinical trial considered short-term elimination of aspiration. The results of the studies were inconclusive, suggesting the need for further research.

A good RCT (Robbins et al, 2008), conducted in America, compared the effectiveness of a chin-down posture and two consistencies (nectar or honey) of thickened liquids, for frail elderly patients with dementia, or dysphagia and dementia,, on the incidence of pneumonia. The 515 patients aged 50 years or older were patients of 47 hospitals and 79 subacute facilities. Study participants were randomly assigned to drink nectar-thick or honey-thick liquids in a head-neutral position or to drink thin liquid in a chin-down posture. Experienced speech-language pathologists, nurses and direct care and dietary staff supervised the administration of the intervention. The three month cumulative incidence of pneumonia was lower for patients in the chin-down posture group than in the thickened-liquid groups. In the nectar-thick group the pneumonia incidence was lower when compared with the honey-thick group. The overall incidence of pneumonia was much lower than expected in this frail elderly population. The findings from this study suggest that chin-down posture could be a more effective intervention than honey-thickened liquids or nectar-thickened liquid but no definitive conclusions can be drawn. A further study to investigate the drinking of nectar-thick liquids in the chin-down posture could be beneficial.

A clinical trial (Logemann et al, 2008), conducted in America, investigated 711 patients with Dementia, or Parkinson's Disease with and without dementia, who aspirated on thin liquids. Patients received each of the three interventions in a randomly assigned order while been assessed videofluorographically. The three interventions were drinking a thin liquid in the chin-down posture, drinking honey-thickened liquids and drinking nectar-thickened liquids. The study found that aspiration was eliminated most often with honey-thickened liquids, followed by nectar-thickened liquids and then the chin-down posture. The patients with most severe dementia benefited least from the interventions which could be due to greater physiologic abnormality in their swallows than patients with less severe dementia. This study indicates that the severity of a patient's dementia could impact on the effectiveness of the treatment they receive to prevent aspiration.

## Post-Cancer treatments

McCabe et al (2009) undertook an evidence-based systematic review focused on individuals with dysphagia satiated with post-cancer treatments the behavioural interventions included three postural interventions (side lying, chin tuck and head rotation) and for swallowing manoeuvres

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(effortful swallow, Mendelsohn, supraglottic swallow, super-supraglottic swallow). A literature search covering the period between March 2007 and 2008 identified six studies. All studies were exploratory with fairly low quality mark of schools. The authors concluded that there was currently limited evidence showing the positive effects of behavioural swallowing interventions for populations with structural disorders. However they warned that the range of structural deficits resulting from cancers and their treatments made research in this area particularly challenging.

### **Elderly People with dysphagia**

A small interventional study (Wright, Cotter, & Hickson, 2008), conducted in the UK, investigated the impact of the one-to-one targeted feeding assistance of elderly patients with dysphagia. The targeted feeding assistance was conducted by trained volunteers who were undergraduate nutrition students who had attended a week long training course conducted by an experienced dietician and speech and language therapist. The data from the patients who received targeted feeding assistance was compared with data collected previously from dysphagic patients who had not received feeding assistance. The group with targeted assistance had higher intakes of energy and protein from meals and supplements combined compared to the comparison group. The findings from this small study suggest that targeted feeding assistance by trained and adequately supervised volunteers can improve nutritional uptake in hospitalised elderly patients. Patients in the feeding assistance group were located in wards throughout one hospital which could be some distance from each other meaning that feeding assistants could only help two people at each mealtime. The findings from this study have implications for ward resources because the feeding assistance would take up a lot of staff time.

### **Studies involving children with dysphagia**

#### **Cerebral Palsy**

**Readers may wish to refer to the literature synthesis related to Dysarthria, which includes studies of relevance to this section.**

Two of the included studies considered interventions for children with swallowing difficulties and cerebral palsy. A literature review reviewed the worldwide literature on oromotor treatment and the other study investigated the effectiveness of an intervention comprising a device and speech-language therapy.

A literature review (Davies, 2003) reviewed the evidence for the effectiveness of oromotor treatment for cerebral palsy in children. Oromotor treatment programmes consist of training in the development of coordinated movements of the mouth, respiratory and phonatory systems for communication as well as oral feeding. The actual methods of the intervention in the studies reviewed varied from the use of appliances, to hands on therapies involving massage, temperature and vibration. Effectiveness was considered based on 4 main outcomes: improvement in oromotor skill level, decrease in duration of mealtimes, improved clearing from the pharynx, and improvement in growth. The studies retrieved were of variable quality with their methodologies ranging from single-case design to controlled trials without randomisation. Comparisons between the different studies were not possible because there was no consistency in the measurement of dysphagia impairment or severity. The review found limited evidence for oromotor treatment leading to improved clearing from the pharynx. Two well-designed controlled trials provided limited to

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moderate evidence for the improvement of oromotor skills levels in the moderately eating-impaired group. The evidence from the controlled trials suggests that oromotor treatment does not lead to an increase in growth or to a decrease in mealtime duration. It appears that oromotor treatment can improve oromotor skill level in the moderately eating-impaired group but the evidence is currently unclear as to whether these benefits can actually be generalised to functional gains during mealtimes.

A small case series (Gerek & Çiyiltepe, 2005), conducted in Turkey, investigated an intervention consisting of the wearing of a Castillo-Morales Device (CMD) and speech-language therapy to manage dysphagia in seven children with cerebral palsy. None of the children had previously received speech-language therapy. The CMD was designed and fitted specifically for each child by a paediatric dentist. The children built up their wearing of the device over a 4 week period until they were wearing the device all day when awake and during meals. They then continued to wear the device for a further 10-12 weeks. Additionally, the children received speech language therapy sessions twice a week for 12 weeks, with Vojta therapy (automatic postural reactivity, spontaneous motor function and reflexology) including oral motor range of motion exercises. The speech-language therapy and exercises aimed to facilitate facial muscles, develop lip closure, tongue placement, and to re-train swallowing. At completion of the speech-language therapy the children were able to close their lips during the day, keep their tongue in their mouth and produce bilabial sounds. The results also showed improvements in the children's saliva control, a decreased risk of aspiration and a higher consistency in their food intake. Feedback from the participants' parents indicated that they were satisfied with the outcomes of the intervention. After six months, five of the children were able to stop wearing the CMD with the other two children continuing to wear it for another two months. The findings from this small study suggest that a CMD plus speech-language therapy could possibly be a useful intervention for managing dysphagia in children with cerebral palsy and that a larger study might be useful.

### **Post-Cancer treatments**

A small prospective study (Morgan et al, 2008) investigated the pre and post-surgical outcomes associated with posterior fossa tumour (PFT) in children. Eleven children formed the convenience sample for this study. The children were assessed pre and post-surgery for dysphagia using a clinical bedside evaluation. Two months after surgery parents were interviewed over the phone to determine whether their child had returned to a full oral diet. None of the eleven children had dysphagia before the surgery. After the surgery 8 out of the 11 children had dysphagia. Dysphagia severity was mainly mild (6/8). The prognosis for children with dysphagia following surgery for PFT was positive with 75% (6/8) of children managing a full oral diet two months after their surgery. The preliminary data from this study suggest that speech and language therapists may not be required pre-surgically but that assessment and monitoring of dysphagia may be required in the acute phase after surgery for removal of PFT.

### **Traumatic Brain Injury**

A small cohort study (Morgan, Ward, & Murdoch, 2004), conducted in Australia, investigated the outcomes of children with dysphagia following a traumatic brain injury. The outcomes considered were oral-motor impairment and swallowing function. The study investigated 13 children admitted to hospital with a moderate to severe traumatic brain injury who developed dysphagia. The children were referred to speech pathology an average of nine days after their brain injury once the medical

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officer in charge had determined that they were medically stable. The children were then assessed for dysphagia, cognitive status and oral-motor skills using standard measures, twice a week until their swallowing problems were resolved and they were able to resume a normal diet. The majority of children (7/13) demonstrated full recovery from dysphagia from week 5, but some children did not demonstrate resolution of their dysphagia until 11 weeks after referral. Oral-motor deficits returned to normal status between three and 11 weeks post-referral across the patient group. Swallowing function and the resumption of a normal diet were also achieved by three to eleven weeks post-referral with the two outcomes being highly correlated. The three to eleven weeks post referral equated to an average of 12 weeks post-injury. This initial profiling of dysphagia and its resolution in the paediatric traumatic brain injury population will provide information about the course of rehabilitation of dysphagia and will allow more informed service provision and rehabilitation planning for this population. The findings from this small study suggest that patients with dysphagia following a traumatic brain injury should be prioritised for early assessment of swallowing difficulties by speech pathology and then monitored until at least three months after their injury.

## **Intervention type**

### **Assessment methods**

A literature review (Ramsey, Smithard, & Kalra, 2003) synthesised evidence from the International literature on the various assessment methods to complete early assessment of dysphagia in acute stroke patients and then considered the advantages and disadvantages of the different methods. The most frequent method used to assess swallowing was the bedside swallow assessment. If further assessment is then required, videofluoroscopy is usually used. Bedside swallow tests are safe for patients and relatively easy and quick to perform. However, silent aspiration can be missed in some bedside tests and reliability is variable. In terms of assessing swallow mechanics and testing compensatory techniques, videofluoroscopy has advantages over bedside tests. However, the results provided are dependent on following operating procedures correctly, and assessors being properly training to interpret the results. Additionally, many acute stroke patients recover from dysphagia within two to four weeks after a stroke; thus to subject patients to a complicated test may be unnecessary. The study concluded that, although bedside tests are a useful early screening tool, there are not always completely accurate. The development of more reliable bedside tests would enable a range of professionals to screen patients for swallowing problems quickly and easily and enable patients to be fed appropriately.

A further study by Hinchey et al (2005) examined the process of dysphagia screening procedures for persons following stroke and found that formal dysphagia screening was associated with a higher adherence rate, improved detection and decreased risk of pneumonia. They concluded that formal screening protocols should be offered to all stroke patients regardless of stroke severity.

Fibreoptic endoscopic evaluation of swallowing (FEES) has been found to improve the accuracy of the detection of the presence of dysphagia, the underlying causes of this and the presence and severity of aspiration. It is also used to evaluate methods of management by examining the impact of different head positions and dietary substances. It has been argued that this improves selection of appropriate treatment procedures. (McGowan et al 2007, Leder 1998, Ajemian et al 2001)

## **Speech and language therapy interventions**

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Nine of the studies investigated speech and language therapy interventions for people with dysphagia due to a variety of conditions. The speech and language therapy interventions were varied and covered swallowing therapy - direct and indirect - behavioural interventions, education and exercise.

An excellent Cochrane systematic review (Bath, Bath-Hextall, & Smithard, 1999) investigated the effectiveness of different interventions for dysphagia in acute stroke patients. The study identified one trial on the effectiveness of swallowing therapy. The review found that formal swallowing therapy did not significantly reduce dysphagia when compared with standard treatment. Another good systematic review (Foley et al., 2008) reviewed the evidence for different treatments of dysphagia in patients who had suffered a stroke. This review was completed nine years after the Cochrane review and identified RCTs published from 1966 until August 2007. Two of the RCTs investigated the effectiveness of general swallowing treatment programmes. Such programmes are recommended and administered by speech-language pathologists. The overall evidence suggested that swallowing treatment programmes are associated with a reduced risk of pneumonia during the acute stage of stroke. One of the included RCTs (Carnaby, Hankey, & Pizzi, 2006) was conducted in Australia and investigated the effect of a behavioural intervention at high and low intensity compared with usual care for patients with dysphagia following acute stroke. Usual care was prescribed by the attending physician. The standard low-intensity behavioural intervention consisted of swallowing compensatory strategies, mainly environmental modifications, safe swallowing advice, and appropriate dietary modification, under the direction of speech pathologists three times weekly for a month or duration of hospital stay. The standard high-intensity swallowing therapy consisted of direct swallowing exercises and appropriate dietary modification, under the direction of a speech pathologist every working day for a month or duration of hospital stay. In the usual care group 56% (57/102) survived at 6 months free of an abnormal diet compared with 67% (136/204) allocated standard swallowing therapy. Of the patients allocated high-intensity 70% survived free of abnormal diet at 6 months compared with 64% low-intensity and 56% usual care. Compared with usual care and low-intensity therapy, high-intensity therapy was associated with an increased proportion of patients who returned to a normal diet and recovered swallowing by 6 months. The results from the high-intensity and low intensity intervention were not markedly different, so it was not possible to determine whether there is a differential treatment effect or if the low-intensity behavioural intervention could be as effective as the high-intensity. The statistically significant study results lend support to the potential value of behavioural swallowing interventions for patients with dysphagia after acute stroke to help them return to prestroke swallowing function and minimisation of dysphagia-related outcomes. The findings from the second later systematic review and the RCT indicate that swallowing therapy could be a useful intervention to manage dysphagia in patients who have suffered stroke.

An excellent systematic review (Bilney, Morris, & Perry, 2003) investigated the evidence for the effectiveness of physiotherapy, occupational therapy and speech pathology for people over 18 years old with Huntington's Disease. The review concluded that there is some evidence that interventions provided by speech pathologists can improve the ability of people with Huntington's Disease to feed independently. Additionally, there is limited evidence that dysphagia can be improved with speech pathology interventions.

A pilot RCT (Sullivan & Dangerfield, 2002), conducted in the UK, investigated the impact of direct and indirect speech language therapy on older patients who had suffered a stroke. The comparison group received direct speech and language therapy intervention three times a week and daily indirect-trained nurse management. The experimental group received indirect management via

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trained nursing staff responsible for their day-to-day management. The average time for the comparison group to achieve a functional swallow was 32 days, and for the experimental group 25 days. The results suggest the importance of a multidisciplinary team in dysphagia management and a possible important role for the speech and language therapist in training.

A small UK comparison study (Lucas & Rodgers 1998) compared the dysphagia management of stroke patients in two hospitals with differing speech and language therapists involvement in dysphagia services. At hospital A there was a speech and language therapy dysphagia service for in-patients while hospital B had an extra-contractual referral (ECR) for dysphagia assessment by speech and language therapists from another hospital. At hospital A there was better identification of dysphagia, more complete documentation of nutrition and hydration management, less risky dysphagia management and less perceived need for chest physiotherapy when compared with hospital B. The findings from this study provide additional support for the important role of speech and language therapists in dysphagia services.

Two of the studies investigated speech and language therapy interventions that included education and exercises. A pilot RCT (Marks et al, 2001) investigated the efficacy of speech and language therapy intervention compared with botulinum toxin injections to control drooling in patients with Parkinson's Disease. The speech and language therapy included education about drooling, a drooling awareness chart and a portable metronome brooch that was used for 30 minutes daily to cue swallowing. Following both interventions participants showed a reduction in drooling severity compared with their baseline scores and the scores of an aged matched comparison group. The findings from this study indicate that a speech and language therapy intervention using a behaviour modification programme combining education and exercises may help reduce drooling in patients with Parkinson's Disease. Additionally, a small UK interventional study (Millichap, Lee & Pring 2005) investigated the effect of a treatment programme that included education, reassurance and the use of exercises to treat 14 clients with psychogenic dysphagia. The clients attended a group therapy session which covered education about physiology of swallowing, discussed causes of abnormal swallowing and allowed the group to describe and discuss their problems together. Clients were taught exercises which they were to do five times a day for eight weeks. The clients Glasgow and Edinburgh Throat Scale (GETS) scores improved indicating that the treatment helped them. This study suggests that an intervention with a variety of different components might be the most effective in treating the variety of different clients with psychogenic dysphagia. These two treatments combined exercises and education in a speech and language therapy intervention, and the findings from these small studies indicate that it could be a useful approach for dysphagia management. Additionally, the interventions in both studies were inexpensive in terms of the speech and language therapists' time and did not require patients to attend regular outpatient appointments.

A small case series (Gerek & Çiyiltepe, 2005), conducted in Turkey, investigated the wearing of a Castillo-Morales Device (CMD) and speech-language therapy to manage dysphagia in children with cerebral palsy. The children built up their wearing of the device until they were wearing it all day; they then continued to wear the device for a further 10-12 weeks. The children also received speech language therapy twice a week for 12 weeks. At completion of the speech language therapy the children were able to close their lips during the day, keep their tongue in their mouth and produce bilabial sounds. The results also showed improvements in saliva control, decreased risk of aspiration and higher consistency in food intake. After six months, five of the children were able to stop wearing the CMD; the other two children continued to wear it for another two months. The findings from this small study suggest that a CMD plus speech language therapy could be a useful intervention for managing dysphagia in children with cerebral palsy.

## Diet Modification

A common practice in dysphagia management is making changes to the texture of a patient's diet. Five of the studies considered texture-modified diet. The findings from these studies were inconclusive. The most useful diet modification strategy could depend on the individual patient; a patient's own treatment preference should also be considered when deciding on modifications to their diet.

A good systematic review (Foley et al, 2008), completed in 2008, reviewed the evidence for different treatments for dysphagia in patients who had suffered a stroke. The review identified RCTs published from 1966 to August 2007 that examined the efficacy of therapies for dysphagia following stroke. The review included 15 studies covering a broad range of therapies including texture-modified diets, general dysphagia therapy programmes, non-oral feeding, medications and physical and olfactory stimulation. Dietary texture modification was evaluated in four studies. The review was limited to RCT evidence; however, the quality of the trails was generally only fair. Four RCTs investigated the effectiveness of dietary texture modifications and/or alteration of fluid viscosity. Modifications in dietary textures are a common treatment for dysphagia; however, the evidence for their medical effectiveness is limited.

A good RCT (Robbins et al, 2008) building on a study Logemann et al (2008-described below) conducted in America, compared the effectiveness of a chin-down posture and two consistencies (nectar or honey) of thickened liquids for frail elderly patients with dysphagia on the cumulative incidence of pneumonia after three months. Study participants were randomly assigned to drink nectar-thick or honey-thick liquids in a head-neutral position or to drink thin liquid in a chin-down posture. The three month cumulative incidence of pneumonia was lower for the chin-down posture group than in the thickened-liquid groups. The pneumonia incidence was lower in the nectar-thick group compared with in the honey-thick group. This study suggests that a chin-down posture can reduce the incidence of pneumonia more than thickened liquids although no definitive conclusions can be drawn. A further study to investigate the impact of drinking nectar thick liquids in a chin-down posture on the incidence of pneumonia might be useful.

A clinical trial (Logemann et al, 2008), conducted in America, investigated 711 patients with Dementia or Parkinson's Disease who aspirated on thin liquids. Patients received each of the three interventions in a randomly assigned order while been assessed videofluorographically. Patients in the three interventions drank a thin liquid in the chin-down posture, honey-thickened liquids and nectar-thickened liquids. The study found that aspiration was eliminated most often with honey-thickened liquids, followed by nectar-thickened liquids and chin-down posture. For approximately half the patients investigated aspiration was stopped by one or more of the three interventions indicating the importance of assessing each of the interventions to ensure that the best prevention method is selected for each individual patient. The patients with most severe dementia benefited least from the interventions. Patients with Parkinson's Disease without dementia were also asked about their preference for each intervention. The most popular intervention was a chin-down posture followed closely by the nectar-thickened liquids. This study demonstrates that videofluorographic swallow assessment can help to determine the most appropriate short-term intervention to stop aspiration. It is important to also consider the preferences of each individual patient when determining their treatment plan. This study only considered the short-term outcome of these interventions and the longer-term impact could be beneficially assessed.

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A small cohort study (Finestone et al, 2001), conducted in America, investigated whether stroke patients with dysphagia met their estimated fluid recommendations when receiving an oral or non-oral diet. The oral diet consisted of a thickened-fluid dysphagia diet and the non-oral diet was enteral feeding supplemented with intravenous fluids. The dysphagic stroke patients that received the oral diet did not meet their fluid requirements while patients receiving the non-oral diet did. The findings from this small cohort study suggest that initially providing patient with a non-oral diet may help them reach their fluid recommendations better than with the use of a thickened-fluid diet. A further large good quality study in this area could be beneficial.

A survey (Garcia, Chambers & Molander, 2005) of speech-language pathologists in America investigated their practice patterns in the use of thickened liquids for the management of patients with swallowing difficulties. The questions considered use of thickened liquids, information about thickening products and service delivery, patient perceptions, professionals responsible for producing thicken liquids and the training provided for this role. The internet survey was emailed to the ASHA Division 13, Swallowing and Swallowing disorders (Dysphagia) professional email list in March 2004. The survey was completed by 149 participant;, 145 were speech-language pathologists. The speech-language pathologists primarily managed adult patients with dysphagia. The majority (84.8%) indicated that they thought thickening thin liquids was an effective intervention. Speech-language pathologists believed that nectar-thick consistencies were more effective than honey-like and spoon-like consistencies. The respondents perceived that their patients did not like thickened liquids. The institution where the speech-language pathologists worked had varied training provision for training in thickening liquids, with only a small number having structured training programmes. The results from this survey highlight the complex issues surrounding speech-language pathologists' use of thickened liquids. Further information could also be found by considering the other members of the multidisciplinary team involved in dysphagia management. This survey has important implications relating to the management of dysphagia using thickened liquids in America, and a similar survey of speech and language therapists in the UK would be useful.

## Behavioural treatments

A systematic review of behavioural treatments and approaches for oropharyngeal dysphagia was undertaken by Wheeler-Hegland et al (2009) following a search of 14 electronic databases they identified 17 studies meeting the inclusion criteria. The majority of the studies (eight of the 17) investigated the procedure 'effortful swallow' three studies examined the Mendelssohn manoeuvre, chin tucked, and supraglottic swallows. A further two studies examined the value of head rotation. The authors also reviewed the impact of these procedures on those without dysphagia and were able to establish that some of these behavioural techniques did have an impact on swallowing physiology whereas others did not. These studies revealed changes to the swallow biomechanics which were often not originally targeted by the manoeuvres. The authors concluded that six of the seven interventions studied provided physiological evidence supporting the underlying hypothesis of the treatment strategy. This research paper is one of a series of five developed in collaboration with the American Speech and Hearing Association exploring the evidence base for speech and language therapy involvement in the management of patients with dysphagia.

## Pharmacological interventions

Two studies investigated the effectiveness of pharmacological interventions for managing dysphagia. An excellent Cochrane systematic review (Bath, Bath-Hextall, & Smithard, 1999),

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completed in 1999, investigated the effectiveness of different interventions for treating dysphagia in acute stroke patients. The study identified six small RCTs, one trial on drug therapy. Drug therapy with nifedipine did not alter the frequency of dysphagia or end of trial case fatalities. The included trial was a pilot RCT (Perez et al. 1998), conducted in the UK. The RCT investigated the effect of slow-release nifedipine on patients with persistent dysphagia following a stroke. By the end of the four weeks of treatment assessments showed that nine patients had improved their swallow, five in the treatment and four in the placebo group. Patients in the treatment group experienced significant improvements in their pharyngeal transit times and swallowing delay. The results from this small pilot RCT suggest that treatment with pharmacological agents such as nifedipine could have a role in the management of persistent, but not severe, dysphagia following stroke. The results are inconclusive and a further study in this area would be beneficial.

### Feeding assistance

A small interventional study (Wright, Cotter, & Hickson, 2008) investigated the impact of one-to-one targeted feeding assistance by trained volunteers of elderly dysphagia patients. The group with targeted assistance had higher intakes of energy and protein from meals and supplements combined compared to the comparison group. The findings from this small study suggest that targeted feeding assistance by trained and adequately supervised volunteers can improve nutritional uptake in hospitalised elderly patients. These initial findings have important implications for ward resources; providing feeding assistance can take up a large amount of staff time and therefore would only be possible with an increase in staff or volunteers.

Pinnington, L. and Hegarty, J. (1999) used an ABA design to study 'consistent feeding practices' with 16 severely disabled children between the ages of seven and 17 years old. Statistically significant differences in components of oral-motor behavior were found when a consistent method of food presentation was employed and significant improvements, which could not be attributed to maturation alone, were found between assessment periods.

### Group therapy

Group therapy was investigated in one small UK study (Millichap, Lee, & Pring, 2005). The group therapy was part of a treatment programme that also included education, reassurance and the use of exercises to treat 14 clients with psychogenic dysphagia. The clients attended a group therapy session covering education about the physiology of swallowing, discussing causes of abnormal swallowing and allowed the group to describe and discuss their problems together. The clients' Glasgow and Edinburgh Throat Scale (GETS) scores improved indicating that the treatment helped them. However, the clients GETS scores also improved during the baseline phase so further research would be needed to determine whether the treatment actually had an effect or if clients benefit from the reassurance and general attention. While the evidence from this initial study is inconclusive, the treatment itself only took up a small amount of the speech and language therapist's time and the group therapy element enabled clients to meet others with similar symptoms. This study suggests that an approach including group therapy could be useful for treating clients with psychogenic dysphagia.

## **Oromotor treatment**

One literature review (Davies, 2003) investigated the evidence for the effectiveness of oromotor treatment for cerebral palsy in children. Effectiveness was considered in terms of four main outcomes: improvement in oromotor skill level, decrease in mealtimes, improved clearing from the pharynx and improvement in growth. No details were provided of the therapists providing the oromotor treatment. The review found limited evidence for oromotor treatment leading to improved clearing from the pharynx. Two well-designed controlled trials provided limited to moderate evidence for improvement of oromotor skills levels in the moderately eating-impaired group. The evidence from the controlled trials suggests that oromotor treatment does not lead to an increase in growth or to a decrease in mealtime duration. It appears that oromotor treatment can improve oromotor skill level but the evidence is unclear as to whether benefits actually generalise to functional gains during mealtimes.

## **Quality of life**

A survey (Farri, Accornero, & Burdese, 2007), conducted in Italy, assessed the quality of life of patients with dysphagia following surgery. 73 patients were surveyed on questions concerning their medical history, eating habits, personal feelings, information about dysphagia, and their health. Nearly half (40%) of the sample were under 60 years of age, still working and had busy social lives. Following operations which lead to their dysphagia, the patients became weaker, experienced lower self-esteem and limited their social relationships. Due to embarrassment, eating restrictions, needing help with feeding and a lack of interest in food, the patients no longer found mealtimes pleasant or saw them as a social activity. To overcome their difficulties with swallowing, food consistencies had to be altered and strategies learnt to improve swallowing. Once patients were informed about dysphagia and strategies to tackle it by doctors and health care workers, their lives improved qualitatively. The patients that had received speech therapy rehabilitation all agreed that this had improved their quality of life as they were taught strategies that made swallowing easier. The survey demonstrates that dysphagia can have negative social and economic impacts on an individual's quality of life.

## **Summary**

The different studies included in this synthesis demonstrate the varied conditions in which dysphagia is associated. Many different treatments are common clinical practice even though the evidence for them is limited. There is some evidence for swallowing therapy which is a common practice. Diet modification is another common practice, but the evidence supporting its effectiveness is at present limited. The studies demonstrate the important role of speech and language therapists in the assessment and management of dysphagia and in administering interventions and training staff.

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### Dysphagia synthesis

Study	Country	Study Design	Subjects	Intervention
(Bath, Bath-Hextall, & Smithard 1999)	Worldwide	Systematic review	Six small studies investigating patients with acute stroke and dysphagia diagnosed either clinically or using videofluoroscopy.	Four main types of interventions were reviewed: <ol style="list-style-type: none"> <li>1. The effect of the feeding route</li> <li>2. The timing of feeding</li> <li>3. The effect of nutritional and fluid supplementation</li> <li>4. The effect of formal swallowing therapy</li> </ol>
(Bilney, Morris, & Perry 2003)	Worldwide	Systematic review	42 people with Huntington's Disease from 2 papers. Subjects were over 18 years old.	Diet modification, intensive speech pathology intervention, adaptive eating equipment and modified body positioning.
(Carnaby, Hankey, & Pizzi 2006)	Australia	RCT	306 patients with clinical dysphagia admitted to hospital with acute stroke.	Patients were randomised to receive usual care, a standard low-intensity intervention, three times a week for up to a month or a standard high-intensity intervention daily for up to a month.
(Davies 2003)	Worldwide	Literature review	Children with cerebral palsy. The number of subjects investigated in the eight included studies ranged from single subjects to larger studies with more	Oromotor treatment.

## Dysphagia

Study	Country	Study Design	Subjects	Intervention
			than 30 subjects.	
(Farri, Accornero, & Burdese 2007)	Italy	Survey	73 patients, age range 40-80 years, almost 40% under 60 years of age.	Survey assessing quality of life of patients with dysphagia following one of the following operations: ENT, maxillo-facial, neurological and presbiphagic.
(Finestone et al. 2001)	USA	Pilot cohort study	13 first stroke patients with dysphagia	Seven of the patients were started on non-oral feeding and six patients received oral dysphagia diets only.
(Foley et al. 2008)	Worldwide	Systematic review	Patients with dysphagia following stroke. Mean age in all 15 included studies ranged from 67 to 86 years.	Any treatment for dysphagia post-stroke including texture-modified diets, general dysphagia therapy programmes, non-oral feeding, medications and physical and olfactory stimulation.
(Garcia, Chambers, & Molander 2005)	USA	Survey	Speech and language therapists involved in dysphagia management.	Considers use of thickened liquids in dysphagia management.
(Gerek & Çiyiltepe 2005)	Turkey	Case series	Seven children with cerebral palsy. Age range 8-17 years. Three males and four females.	Dysphagia management including Castillo-Mo-roles Device, speech and language therapy and oral-motor range of motion exercises.
(Logemann et al. 2008)	USA	Clinical trial	711 patients with dementia or Parkinson's Disease. Aged 50-95 years old. 79% male, 21% female.	Compares three interventions for aspiration of thin liquids. Interventions are chin-down posture, nectar-thickened liquid and honey-thickened liquid.
(Lucas & Rodgers 1998)	UK	Clinical trial	114 patients who had experienced their first stroke. Median age of 75 years (range 44-104). 56% female, 44% male.	Compares dysphagia management in two hospitals with differing involvement of speech and language therapists.
(Marks et al. 2001)	UK	Pilot RCT	Parkinson's Disease patients with drooling &	Patients were randomised to either a speech and language therapy intervention or botulinum toxin

Study	Country	Study Design	Subjects	Intervention
			swallowing difficulties. 28 patients were recruited, 18 men & 10 women Average age 64.8 years and average duration of Parkinson's Disease was 15.7 years.	injections. Their results were compared with an age-matched comparison group.
(Millichap, Lee, & Pring 2005)	UK	Cohort study	14 patients with psychogenic dysphagia (globus pharyngeus). Mean age 52.5 years, range 24-78 years. Ten male and four female.	Group treatment programme including education, the use of exercises and reassurance. Patients were to do exercises five times a day until follow-up eight weeks later.
(Morgan, Ward, & Murdoch 2004)	Australia	Cohort study	13 children with moderate to severe traumatic brain injury (TBI). Seven male and six female. Aged 4 years 1 month to 15 years old; mean age 7 years and 4 months.	To assess clinical progression and outcomes of dysphagia in children with TBI.
(Morgan et al. 2008)	UK	Prospective study	11 children who had had surgical removal of posterior fossa tumours (PFT). Aged 3 years 6 months to 13 years 5 months. Eight male and three female.	To document presence, severity and characteristics of dysphagia pre and post surgical removal of PFT.
(Perez et al. 1998)	UK	Pilot RCT	17 hospitalised patients with persistent dysphagia two weeks after stroke. Eight	Patients received slow-release nifedipine 30 mg orally or placebo for four weeks.

Study	Country	Study Design	Subjects	Intervention
			patients in nifedipine group had a mean age of 77.3 years; there were four men and four women. Nine patients in the placebo group had a mean age of 76.8 years; there were four men and five women.	
(Ramsey, Smithard, & Kalra 2003)	Worldwide	Literature review	Acute stroke patients.	Assessment of dysphagia and aspiration risk.
(Robbins et al. 2008)	USA	RCT	515 patients from 47 hospitals and 79 subacute care facilities. Aged 50 years or older with dementia or Parkinson's Disease who aspirated their liquids.	Patients either drank all liquids in a chin-down posture or drank nectar-thick or honey-thick liquids in a head-neutral position.
(Sullivan & Dangerfield 2002)	UK	Pilot RCT	20 patients in the acute stage of stroke recovery with dysphagia persisting for more than 48 hours. Aged 65 years and over.	Patients were assigned to either a comparison group receiving direct SLT intervention three times a week, in addition to daily indirect-trained nurse management, or an experimental group receiving indirect management via trained nursing staff.
(Wright, Cotter, & Hickson 2008)	UK	Interventional study	46 elderly patients with dysphagia.	Patients received targeted feeding assistance from trained volunteers. Data from these patients was compared with previously collected data from dysphagic patients who had received no targeted feeding assistance.

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