



# Best Practice

Evidence Based Practice Information Sheets for Health Professionals

## Identification and Management of Dysphagia in Children with Neurological Impairment

### Acknowledgment

This *Best Practice* Information Sheet has been based on a systematic review of research published by The Joanna Briggs Institute entitled Identification and Nursing Management of Dysphagia in Individuals with Neurological Impairment<sup>1</sup>. This research has been supported by a grant from the Sylvia & Charles Viertel Charitable Foundation. The primary references on which this information is based are available in the systematic review report.

### Definition of Dysphagia

Difficulty in swallowing

### Introduction

A systematic review was conducted to identify the nurse's role in the identification and management of dysphagia, the effectiveness of nursing interventions in recognition and management of dysphagia and availability of information for parents and carers in the management of dysphagia in children. This review was limited to dysphagia resulting from a neurological impairment; children over the age of 12 months and maintenance of safe oral nutrition and hydration. Some children with dysphagia may require non-oral feeding. Specific non-oral feeding interventions are not covered in this review.

This Best Practice Information Sheet Covers the Following Concepts:

- Physiology of Normal Swallowing
- Causes of Dysphagia
- Identification and Assessment
- Signs and Symptoms
- Management
- Family Centred Approach

### Quality of Evidence

Of the 25 papers included in the review, 12 were based on expert opinion (level IV), 10 were classified as descriptive studies (level IV) and three were case control studies (level III.2). Some studies used small sample sizes and convenience samples of children with dysphagia for studies into effectiveness of interventions. No evidence related to the role of the nurse in management of dysphagia in children was identified. The aim of this *Best Practice* Information Sheet is to provide information that will assist nurses in the recognition, assessment and management of dysphagia in children.

### Levels of Evidence

All studies were categorised according to the strength of the evidence based on the following classification system.

#### Level I

Evidence obtained from a systematic review of all relevant randomised controlled trials.

#### Level II

Evidence obtained from at least one properly designed randomised controlled trial.

#### Level III.1

Evidence obtained from well designed controlled trials without randomisation.

#### Level III.2

Evidence obtained from well designed cohort or case control analytic studies preferably from more than one center or research group.

#### Level III.3

Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments.

#### Level IV

Opinion of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

### Physiology of Normal Swallowing

The act of swallowing is a complex process and requires the coordination of cranial nerves, the brain stem, cerebral cortex and 26 muscles of the mouth, pharynx and oesophagus. The main cranial nerves that influence swallowing include the trigeminal (V), the facial (VII), glossopharyngeal (IX), vagus (X) and hypoglossal (XII). These nerves mediate the sensation and

movement related to swallowing. Any abnormalities affecting these nerves, the cerebral cortex, mid brain or cerebellum may have a negative impact on the individual's ability to swallow. The four phases of swallowing include: oral-preparatory, oral, pharyngeal and oesophageal.

## Dysphagia

Dysphagia is characterised by a dysfunction in the sequential oral, pharyngeal and oesophageal phases of the swallowing process. The presence of abnormal movement patterns for example, tongue thrust in children with cerebral palsy, disrupts the normal movement of food from the anterior to the posterior of the mouth. Children with head injury and dysphagia experience difficulties in tongue control and bolus manipulation, problems with movement of food from the mouth to the pharynx and delayed pharyngeal swallow. Delayed or lack of initiation of the swallowing reflex will result in increased risk of aspiration from an unprotected airway. Dysphagia can be mild, moderate or severe.

## Causes of Dysphagia

1. Acute causes include: intra-cranial haemorrhage, cerebral infarction or traumatic injuries.
2. Congenital and chronic causes include: intracranial tumors, cerebral palsy, genetic disorders, encephalopathy and neuropathy. Dysphagia from chronic causes may worsen progressively or remain static. In progressive dysphagia feeding and swallowing skills will deteriorate. In static dysphagia swallowing skills will remain stable, or there may be a slow improvement.

## Identification and Assessment

An understanding of normal and abnormal swallowing patterns as well as other developmental characteristics unique to children is essential for assessment. Identification and assessment of dysphagia is complex and requires the expertise of a multi-disciplinary team. Various assessment methods can be used by a multi-disciplinary team including: a feeding history obtained from parents (refer box

on page 4); clinical bedside evaluation by the speech pathologist; oral motor examination (structural abnormalities of the tongue, palate and jaw; difficulties in any of the four phases of swallowing; abnormalities in oral, laryngeal or pharyngeal movement); and radiological examinations (e.g. videofluoroscopic modified barium swallow study). Additional assessments include: child's hydration and nutritional status, growth and development; and neurological assessment for presence of dystonia which may affect ability to feed. When dysphagia is suspected the child must be referred to a medical practitioner and speech pathologist for assessment.

## Risk factors associated with dysphagia

- Diagnostic groups at risk of dysphagia include children with: multiple disabilities; cerebral palsy; traumatic head injuries; genetic disorders; cerebral infarcts; Rett Syndrome; Down Syndrome; neuro-muscular junction disorders, for example myasthenia gravis and Duchenne's muscular dystrophy. (level IV)
- Upper motor impairments are common in children with neurogenic dysphagia and may affect the ability to control their head, neck and trunk and subsequent ability to swallow and ability to self-feed. (level IV)
- Some neuroleptics and the medications used to control seizures may reduce alertness and ability to swallow. Muscle relaxants administered to children with spasticity may affect ability to swallow. (level IV)
- Presence of dystonia and dyskinesia will affect children's ability to chew, manipulate the bolus in the mouth and swallow. Children suffering from hypotonia may experience poor coordination of posterior tongue resulting in difficulties with the pharyngeal phase of swallowing. (level IV)

## Phases of Normal Swallowing

**Oral preparatory phase:** Voluntary phase. Liquid and food is manipulated to form a bolus. During this phase, bolus is located between the tongue and hard palate, and soft palate is lowered to prevent bolus escaping into the pharynx. The airway is open.

**Oral preparatory phase:** Voluntary phase. Soft palate is elevated and food is moved towards the pharynx by peristaltic movement. There is a simultaneous closure of the naso-pharynx.

**Pharyngeal phase:** Voluntary and involuntary phase. Bolus is transported through the posterior pharynx. Larynx is closed to protect the airway and upper oesophageal sphincter opens.

**Oesophageal phase:** Involuntary phase. Follows each pharyngeal phase. Bolus is transported to stomach by peristaltic movement.

## Nutritional status/growth

Signs of under-nutrition, poor weight gain or failure to thrive may indicate the child could be suffering from dysphagia. (levels IV and III.2)

## Gastro-oesophageal reflux

Gastro-oesophageal reflux (GOR) has been associated with dysphagia, with a 75% incidence in children with cerebral palsy. Signs of GOR include: irritability;

inability to tolerate large feeds, early satiation; and frequent vomiting.

## Management of Dysphagia

Dysphagia in children often occurs parallel with many other streams of abnormal or delayed development including: cognitive, oral motor, and fine and gross motor skills. A child's developmental age and current level of functional swallowing skills, for example the ability to chew, and/or control and manipulate a bolus, should be considered in any management program. (level IV) Dysphagia management requires the expertise of a multi-disciplinary team. Members of this team include medical practitioner, speech pathologist, physiotherapist, occupational therapist, dietitian and nurses. Knowledge of normal and abnormal swallowing and therapeutic techniques is essential for managing the rehabilitation of a child with dysphagia.

Specific interventions are listed below (interventions will vary according to needs of the individual child).

### Monitoring nutrition and hydration

Inadequate nutritional intake may be related to oral motor dysfunction, difficulties in communicating desire for food and food preferences, inability to self-feed, gastro-oesophageal reflux and aspiration. (level III.2) The following interventions/activities will assist in maintenance of nutrition. (levels IV and III.2)

- Dietary assessment by dietitian with experience in paediatrics.
- Record fluid intake and loss (including vomiting and drooling of saliva).
- Record child's oral food intake and weight gain. Some children may require supplementary non-oral feeding. The amount of non-oral feeding should be recorded and included in the child's total fluid and food intake.
- Monitor duration of meal times.

### Positioning

The aim of positioning is to maintain a central body alignment. This requires a symmetrical mid-line, neutral and stable head flexion, neck elongation, depressed but stable shoulder and an elongated trunk, pelvis in neutral position with 90° flexion of hips and slightly dorsi-flexed feet. (level IV)

## Signs and symptoms of dysphagia in children

All signs and symptoms are based on levels III.2 and IV evidence, except respiratory distress and gastro-oesophageal reflux, which are based on expert opinion. (level IV)

- Excessive drooling
- Problems with chewing and swallowing
- Spillage of food from the mouth due to lack of tongue control
- Spitting food
- Food refusal
- Increased duration of feeding i.e. greater than 45 minutes
- Signs of increased effort, fatigue and reduced level of alertness
- Difficulty in managing liquids, pureed foods, semi-solid and solid foods
- Signs of respiratory distress during feeding: changes in normal patterns of respiration; breathing with effort; noisy breathing; signs of fatigue during feeding
- Signs of aspiration: gagging, coughing and choking with ingestion of liquids and food; respiratory distress, including stridor and wheeze
- A history of recurrent chest infections
- Increased oral tactile sensitivity. Signs: extreme sensitivity to touch either in or around mouth; food refusal; withdrawal or facial grimacing; intolerance to some food textures

- Children with poor head control and poor trunk stability will require appropriate and individualised positioning techniques. (level IV)
  - In children with severe cerebral palsy and feeding problems, feeding position can be dependent on degree of dysphagia and whether it is mainly in the oral or pharyngeal phase. The chin tuck and 30° reclining position and flexed hips may be effective in eliminating aspiration in children with major oral phase swallowing problems. In children with minor oral phase but greater pharyngeal phase swallowing difficulties, the erect position with flexed neck and hips was recommended. (level IV)
  - Neck extension is not encouraged as it can impair laryngeal movement and pharyngeal clearance and place the child at increased risk of aspiration. (level IV)
  - Visual judgement of an appropriate and safe position may not be possible and a videofluoroscopic modified barium swallow study may be necessary. (level IV)
- Modifications will vary according to the needs of each child. Videofluoroscopic modified barium swallow studies may be used to determine the safest textures for each child with dysphagia. The following are some examples of modifications that may be recommended. (levels III.2 and IV)
- The size of the bolus may need to be varied with different textured foods and the child's ability to swallow effectively. Small bite sizes are generally recommended. In some instances larger boluses may be beneficial because they increase the child's sensory awareness in the oral cavity and assist in bolus formation and reduced pharyngeal transit time.
  - In children with neuro-muscular disorders (and weakened or unco-ordinated swallowing) a semi-solid consistency may be swallowed more easily as a single bolus.
  - Thickened fluids are recommended as they assist in reducing the risk of aspiration. Use of starch based thickeners is recommended for thickening fluids.
  - Children with swallowing impairment may tolerate a cohesive texture better than a thinner, more liquid food, but may require a greater time for chewing.

### Diet

Children with dysphagia may have difficulties managing different bolus sizes, flavours and textures.

- When considering changes in texture, elasticity and viscosity of food should also be considered.
- A variety of flavours of the recommended texture should be offered to each child. Texture preferences and tolerance should be recorded to determine those tolerated most effectively.
- Children vary in their responses to food temperature, with no evidence for an optimal food temperature.

### Supportive devices in management of dysphagia

Different sizes and shapes of spoons can be used to control the size of the bolus. These modifications in utensils used for feeding will benefit those children who have problems with the oral phase of swallowing. Plate guards, scoop bowls, built-up handles for forks and spoons are useful for children learning to feed by themselves. Angled and swivel handled spoons will benefit children with devices such as slings, arm and finger cuffs can assist with self-feeding. (level IV) Referral to an occupational therapist and a physiotherapist is required when the need for such devices is identified.

### Prevention of complications

#### Aspiration

- Observe for signs of aspiration (coughing, choking and respiratory distress) and record pattern and rate of respiration. If aspiration is suspected oral feeding should be

stopped until the cause is investigated. (level IV)

- Be aware that silent aspiration (i.e. absence of signs) has been reported in children with dysphagia and can occur before, during and after swallowing. (level IV)

### Cognitive and behavioural factors influencing dysphagia management

Cognitive and behavioural factors should be considered in management of swallowing problems. The following recommendations are based on expert opinion. (level IV)

- If cognitive impairment is suspected, child should be referred to appropriate professionals for assessment to ensure they are able to follow instructions when assisted with feeding.
- Verbal instructions should be provided at the child's level of understanding and mental age.
- Non-aggressive strategies should be used in managing food refusal. Forced feeding is discouraged.
- Impulsive children will require close one to one monitoring even when the child is able to swallow safely. Keep meals out of child's reach, remind them to eat slowly, and ensure a bolus is swallowed before offering another bite.
- Children with memory impairment or prone to distraction should be reminded constantly to chew and

swallow their food. Their mouths should be checked at the completion of feeding to prevent choking from any pocketed residual meal.

- In agitated children with head injuries, a distraction-free environment and familiar feeders will assist in maintaining oral feeding.

### Family Centred Approach

- Caring for children with dysphagia can be stressful. One study reported depression in mothers as a result of this stress. Caregivers should be reassured and acknowledged for their efforts in managing their child's feeding and swallowing problems. (level IV)
- Information should be provided to assist caregivers manage the child's swallowing and feeding difficulties. These include: strategies for oral feeding; preparation of nutritious meals; adaptive equipment; positioning techniques; positive interactive behaviours and child's progression in regaining swallowing skills. (level IV)
- A multi-disciplinary approach to provision of services with parental involvement in assessment and management of their child's dysphagia is important. (levels III.2 and IV)

## Feeding history obtained from parents/caregivers

A feeding history from parents and care-givers is important in identifying and assessing specific problems in children with swallowing difficulties. The following information should be obtained for further assessment, when presence of dysphagia is suspected. (levels III.2 & IV)

- Any history of problems with sucking, breastfeeding and commencement of solids
- Problems with chewing and spitting food or eating small amounts of food only
- Tolerance to particular foods and textures
- Coughing and noisy breathing (may suggest aspiration or residue in the pharynx)
- Food refusal (may indicate pain with swallowing)
- Distress during feeding (may indicate pain with swallowing)
- A history of excessive duration of meal-times
- Child's management of food in the mouth (e.g. spits out food at end of meal)
- Specific times of day that the child feeds better
- Influence of environment on success in feeding
- Feeding methods of caregivers – whether some techniques are more successful than others
- Positioning of child during feeding

## Recommendations

### 1. Identification and Assessment

- Knowledge of normal and abnormal swallowing physiology, as well as an appreciation of other developmental factors influencing dysphagia is essential for early recognition and assessment of children at risk of dysphagia. (level IV)
- Awareness of the risk factors and signs and symptoms of dysphagia and aspiration are important in the recognition and assessment of dysphagia. When these are identified, the child's condition should be discussed with a medical practitioner and referred to a speech pathologist for further assessment. (levels IV, III.2)
- Dysphagia should be assessed by a multi-disciplinary team, which includes nurses. Speech pathologists play a primary role in assessment, development and implementation of strategies to manage child's dysphagia. (level IV)
- Poor nutritional status of the child or failure to thrive may be associated with dysphagia in children and should be considered when assessing children for presence of dysphagia. (levels IV)
- Information on feeding difficulties should be obtained from parents and/or carers when presence of dysphagia is suspected. (levels IV, III.2)

### 2. Management

- Knowledge of normal and abnormal swallowing aetiology and an understanding of therapeutic techniques used in management and rehabilitation of the child with dysphagia is essential. (level IV)
- A multi-disciplinary team approach is essential for the management of dysphagia. Nurses play an active role in

the implementation of therapeutic techniques in children with dysphagia. (level IV)

#### Maintenance of oral nutrition and hydration

- Growth, hydration and nutritional status should be monitored in children with dysphagia. (level IV)
- Specific management interventions to maintain oral nutrition and hydration, based on the individual child's needs, should be implemented. (levels IV and III.2)

#### Prevention of complications

- Children with dysphagia should be monitored for signs of aspiration. Interventions, such as paced feeding, should be implemented to ensure safe swallowing. (level IV)
- A child's swallowing ability should be monitored, recognising that it may worsen, remain static or improve. Any changes in swallowing ability should be reported to the speech pathologist or medical practitioner. (level IV)

#### Cognitive and behavioural factors

- It is important to be aware that children with neurological impairment may require cognitive and behavioural therapy as part of their dysphagia management program. (level IV)

### 3. Family-centred approach

- Families and caregivers caring for children with dysphagia require support, information, reassurance and appreciation for their efforts. (level IV)
- Strategies which promote a family-centred approach to management of dysphagia should be implemented. (levels IV, III.2)

## References

1. Ramritu P, Finlayson K, Mitchell A, Croft G. Identification and Nursing Management of Dysphagia in Individuals with Neurological Impairment. The Joanna Briggs Institute for Evidence Based Nursing and Midwifery; 2000. Systematic Review No.8

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