Report:

The future of dysphagia

ProPortion Foods

Swallowing is a deceptively complex act that people do without thinking nearly a thousand times a day – not just when eating and drinking, but also during every waking minute. With ageing, many people develop varying degrees of difficulty swallowing. Not only does this interfere with enjoying foods and drinks, but it has a host of other ramifications for health and wellbeing.

In this report we outline the problem, evolving solutions and technological advancements in the area.

Ageing population

Globally, for the first time, there are more people over 65 than under five years of age. In Australia, the percentage of older people has tripled in less than a century and continues to grow. These enduring global trends can be largely attributed to safer childbirth, fertility declines and improved medical treatments.

In 2017, 3.8 million Australians were aged 65 years and over, according to a survey by the Australian Institute of Health and Welfare. This comprises 15% of the population, compared to just 5% in 1937. In the global scheme of things, that puts Australia about halfway between Papua New Guinea and Japan, countries with the smallest and largest proportions of older adults, respectively.

This "demographic time bomb" is still in steep ascent, expected to reach 8.8 million older Australians – more than one in five people – by 2057, and 12.8 million, or one in four people, by 2097. The profile of this older cohort itself is expected to shift upwards. Two years ago, more than half of older adults were aged 65 to 74. In less than 30 years it's predicted that the number of people in this age bracket will drop while those over 85 will climb from 13% to 20%.

Living longer can have several impacts on health and wellbeing, including dysphagia. The condition can occur at any age but is most common with aging, affecting up to one in five community-dwelling older adults and around half of those living in aged care facilities.

What is dysphagia?

Dysphagia refers to any failure in the act of swallowing. It can range from mild to severe, acute to chronic, and short- to long term, and result in unintentional weight loss, malnutrition and dehydration, social and psychological challenges, complications with other conditions, and, more seriously, life-threatening problems like choking, suffocation and lung infections or pneumonia.

The act of swallowing recruits more than thirty different nerves and muscles to move food and liquid down the correct channels from mouth to stomach. Dysphagia can involve problems with any part of the process, including sucking, chewing, swallowing food, drinks, medication or saliva, and

preventing substances from entering the airway and lungs. It can also include difficulty keeping the lips closed to hold food, liquid or saliva inside the mouth. Further down, if oesophagus valves are weakened, food, drink and stomach acid can come back up.

The most common form is oropharyngeal dysphagia – difficulty with the reflexive act of swallowing itself which involves moving food or liquid from the mouth through the pharynx and into the oesophagus. The other main type is oesophageal dysphagia, which produces the feeling of food being stuck in the throat or chest and possibly chest pain.

The most frequent causes of dysphagia are neurological disorders including stroke, dementia and Parkinson's disease. Other triggers include head injury, motor neuron disease, depression, chronic obstructive pulmonary disease, frailty, cancer and postoperative problems involving the head and neck. Weakened muscles and sarcopenia can also impact swallowing. Pills themselves – which 40% of adults find hard to swallow – can cause dysphagia through medication side effects.

It is very important to identify swallowing problems and their cause as early as possible. People who have experienced stroke are at high risk and should be immediately screened for swallowing problems before ingesting anything. People with other high-risk medical conditions as outlined above should be asked if they have experienced any issues with swallowing.

Apart from obvious difficulties, other signs to look for include coughing before swallowing, during or after eating, heartburn or reflux, drooling, frequent chest infections, storing food in the cheeks, taking a long time to eat, or reluctance to eat or swallow anything. Changes in facial features, speech or voice, like slurring or gurgling, could indicate silent aspiration. Family members should look for these signs and seek professional help if concerned.

Dysphagia management

A team of health professionals helps to manage dysphagia and navigate individuals through the act of safe swallowing and recovery, with speech pathologists at the helm and dietitians on board to carefully

monitor a patient's ability, progress and nutrition status.

In some cases, tube feeding through the nose or stomach (enteral nutrition) or directly into the blood (parenteral nutrition) is the best option to deliver or supplement with life-giving nutrients and fluids. But patients should be supported to eat and drink orally wherever possible.

Guidelines on what to eat or drink

Mildly to extremely thickened liquid or nectar is most commonly used for dysphagia. Most importantly, the degree of a liquid's or food's viscosity needs to be carefully adapted to the patient's swallowing ability. Food standards ensure that people with dysphagia can eat safely.

Australia has used its own viscosity guidelines since 2007: the Australian Standards for Texture Modified Foods and Fluids. These classify fluids as mildly, moderately and extremely thick, and food as soft, minced and moist, and smooth pureed. In May this year, Australia switched to international guidelines. The International Dysphagia Diet Standardisation Initiative (IDDSI) was devised to standardise the terminology and testing of viscosity rankings around the world, for people of all ages in all care facilities. Australia joined more than 20 other countries including New Zealand, the US, Canada, and several European nations in implementing it.

Tailored according to dysphagia severity, viscosity is ranked from soft and bite-sized to pureed food, and thin to extremely thick drinks. Fluids and foods can be easily tested using the "fork pressure", "fork drip", "spoon tilt", "chopstick" and "finger" tests – IDDSI provides video tutorials for each of these on their website to guide consumers, practitioners and manufacturers.

IDDSI categorises foods as regular, soft and bite-sized, minced and moist, pureed and liquidised. Drinks go from thin to slightly, mildly, moderately and extremely thick. Pureed and liquidised food overlaps with extremely thick and moderately thick fluids in Australia's previous guidelines, respectively.

Soft, minced and moist foods can be most easily adapted from existing menus. Examples of "minced and moist" foods include finely chopped/minced meat or finely mashed fish served with extremely thick sauce, mashed fruit or vegetables, and thick,

smooth cereal with small soft lumps. Foods in the “soft and bite-sized” category are similar but can be served in bite-sized lumps. It is important to refer to specific guidelines when preparing these.

It will take time and organisation for health care providers and institutions to complete the transition to the new guidelines – in the meantime both old and new frameworks will both be used so caregivers and aged care facilities will need to be familiar with each of them.

Although there is some overlap between the guidelines, it’s important to note differences. For instance, Level 6 of the IDDSI, which aligns with Texture A – Soft Diet in Australia’s previous standards, specifies that foods must be in “bite-sized” pieces. To guide health professionals, carers and institutions, Speech Pathology Australia – the primary body for speech pathologists – provides supporting material including information on old and new standards and educational posters

SmartServe™ by ProPortion Foods
Honeycomb Buzz dessert
suitable for DDSI Level 4

Nutritional considerations

Dysphagia needs to be carefully managed in any patient, but older populations are of particular concern. Nutrition management is more important than ever to ensure the well-being of older adults, who are at increased risk of malnutrition. This can result from insufficient calories and macronutrients such as protein or micronutrients – vitamins and minerals.

To avoid malnutrition, food and liquid consumption needs to be optimised according to the patient's needs. This may include adding nutritional supplements and providing fortified or nutrient-dense options – like adding milk powder or butter to food – while ensuring foods and liquids are at the correct level of texture-modification for the individual. By using one or more of these options, the risk of malnutrition can be significantly lowered and improve quality of life.

Because thin fluids are avoided for fear of choking, it is important to maintain good hydration, and watch out for signs of dehydration including dark-coloured urine, skin turgor and dry membranes.

Non-food approaches to treatment

Several strategies can help patients swallow, including postural adjustments, swallow manoeuvres, trained feeding assistance, adaptive feeding equipment like special cups, dishes and utensils, and a distraction-free environment.

Treatment for dysphagia includes medical, surgical and behavioural options. Interventions to rehabilitate the swallow function include sensory stimulation, biofeedback, electrical nerve stimulation and a range of different strengthening exercises.

Exercises are designed to target specific muscles involved in swallowing. These oral-motor treatments range from passive to more active. Examples include sliding up a pitch scale and holding a high note to elevate the larynx or holding the tongue forward between the teeth while swallowing (with no food or liquid in the mouth). There are other variations on targeting muscles while swallowing, like the "effortful swallow", "supraglottic swallow" and "super supraglottic swallow manoeuvre".

More physically, the "shaker exercise" involves lying down, raising the head slightly off the ground and looking at the toes for a few seconds, before putting the head back down. This is repeated few times, and the whole sequence three to six times a day. In the "hyoid lift manoeuvre", the patient sucks up and moves up to

10 pieces of paper with a straw into a cup.

These and other exercises are provided as part of an individual treatment plan.

The future of dysphagia management

In addition to innovations in feeding aids, other technological advancements promise to help with dysphagia treatment and management.

One targets remote treatment. The global demand for dysphagia services exceeds the number of available speech pathologists, and poses particular difficulties for people in rural areas. In line with rapid technological advancements, researchers have proposed that telerehabilitation could draw on progress in telehealth to help fill this gap.

First, more research needs to examine the feasibility and effectiveness of telerehabilitation for dysphagia diagnosis and treatment. Various practical, legal, policy and financial challenges also need to be overcome, an issue that American experts are addressing in the United States as the telehealth movement gains traction as a potentially viable option.

To test the feasibility of telerehabilitation in Australia, researchers from the University of Queensland piloted adapted remote clinical swallowing examinations to assess aspiration risk and clinical management of people with dysphagia via web conferencing. They found high levels of agreement with face-to-face examinations and identified technical, personal and training factors that will help facilitate this form of clinical management.

SmartServe™ by ProPortion Foods
Butternut pumpkin soup
suitable for IDDSI Level 3

Overall, they concluded, “The current evidence provides a strong initial evidence base for supporting the use of telerehabilitation in the management of patients with dysphagia. This work will be integral in the process of establishing new models for dysphagia services, designed to enhance access to speech pathology services for more patients in the future.”

Another technology that can help transform dysphagia management is 3D printing. In this innovation, three dimensional objects can be created using a 3D model file from a computer. This file is used to create thinly sliced layers that make up an object – in this case, food.

3D printing can thus automate food creation. The most common device is a deposition printer, where layers made of raw materials are deposited. Any ingredient that can pass through a hollow needle can be used in 3D food. The benefits for dysphagia include improved flavour, nutritional optimisation, and, perhaps even more importantly, enhanced appearance and palatability of food, which in turn can boost appetite and intake.

This could transform texture-modified foods from unappetising slop to gourmet delights, potentially creating meals that resemble anything from pumpkin gnocchi and beetroot-infused butterfly quiche to pizza and mini burgers. The technology is in its infancy, but it’s predicted that 3D food printers could even end up as common household appliances.

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