Dysphagia, commonly known as swallowing problems, is quite common. A significant number of people in long-term elderly care suffer from some form of dysphagia. Treating the condition is a challenge for many therapists. It can be difficult to explain to patients what exercises they should be doing. In many cases, treatment is not completed, and instead, a special diet is prescribed. These diets are not ideal from a social, medical, and financial point of view. Many forms of dysphagia can be treated by intensive exercise training. The SilverFit Rephagia helps to provide this type of training.
VALUABLE INSIGHTS

The Rephagia system supports the speech and language therapist. It helps the therapist provide the patient with a series of exercises known to improve swallowing function. During the exercises, both the therapist and the patient get valuable insights into the patient’s performance. The patient’s swallowing response is characterized using sEMG, a method that measures the activity of the patient’s muscles.

MOTIVATING

The biofeedback system can be shown in the form of graphs, or as game-like exercises that are easy for the patient to understand. Games improve motivation, which is vital in the case of swallowing exercises: the patient has to work hard for a prolonged period of time to regain function. During the tests of the Rephagia, clinicians noted that in comparison to sEMG devices used in research, the Rephagia games made it possible to engage patients with lower cognitive function more easily.

TREATMENT COURSE

The treatment on average takes 12 sessions of half an hour, administered three times a week for four weeks. At the start of the treatment, the patient takes an assessment determining the swallowing function. The key to improve the swallow function is performing a lot of repetitions with progressive resistance. The patient then moves on to training the timing and specificity of the swallow movement. The final part of the training covers coordination and prolongation of the swallow, as in the well-known Mendelsohn maneuver.

FINANCIAL COSTS

Providing special diets is costly because the food has to be bought and prepared separately, and the patient requires assistance and supervision. An analysis by SilverFit of Dutch care homes shows that tube feeding cost 8-9 times more than average food costs.

<table>
<thead>
<tr>
<th>Cost per patient per day, Netherlands</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard diet</td>
<td>€ 4.10</td>
</tr>
<tr>
<td>Supplemental diet</td>
<td>€ 36.06</td>
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<tr>
<td>Pure feeding</td>
<td>€ 53.45</td>
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</table>

Source: SilverFit analysis of data from Health Care Centers. Costs include staff and material costs.

Serious forms of dysphagia are quite prevalent. In our analysis of 8 care homes, 7-22% of patients received food supplements. For an “average” care center with 70 beds, this translates into tens of thousands of euro per year in additional costs. This does not take into account the cost of treating complications.

SOCIAL ISOLATION

Enjoying eating and drinking together is an essential part of social interaction: lunch, tea, coffee, dinner, drinks. Even mild forms of dysphagia-related symptoms such as drooling can contribute to social isolation. Research shows that 55% of people with dysphagia are no longer able to enjoy food, and 36% try to avoid eating with others (Ekberg et al., 2002).

MEDICAL RISKS

Dysphagia can lead to dehydration, malnutrition, weight loss, respiratory problems, pneumonia and upper respiratory infections. For example, 44% of people suffering from dysphagia lose weight (Ekberg et al., 2002). Data from the US show that people with severe forms of dysphagia after a stroke were 3-15 times more likely to suffer from various complications, and 2x more likely to die within a year after the stroke occurred (Medicare). Pneumonia is responsible for about 40% of all stroke-related deaths and represents the 3rd highest cause of death during the first month after a stroke (Kil-Byung Lim et al., 2009).

RELEARNING TO SWALLOW

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Clinical pathways for dysphagia treatment

The treatment plan depends on when the aspiration takes place (before or after the swallow). In both cases, repetition and increased resistance are vital. In addition, the treatment focuses on timing and motor specificity, or on coordination, as summarized in the diagram below.

TIMING AND MOTOR SPECIFICITY

To improve control of swallow onset the patient tries to time their swallow to visual cues. The time between cues can be adjusted to the capabilities and needs of a patient to make it easier or harder.

COORDINATION

In order to gain improved coordination of muscles used for swallowing, the well-known Mendelsohn maneuver is used. Supported by intuitive games or graphs the patient learns to indirectly modify specific aspects of swallowing, such as laryngeal elevation, and pharyngeal wall contraction.

REPETITION & INCREASED RESISTANCE

Repetitions and increased resistance are important in both clinical pathways. They contribute to improved strength. As games strongly motivate patients to keep practicing the swallow movement, this form of biofeedback facilitates the rehabilitation process. Functional patterns of swallowing are trained over and over with increased resistance (different consistencies). This has an impact on the timing and specificity of the swallow movement.

A program of repeated exercise for dysphagia treatment can induce changes in neuroplasticity, and contribute to an increased volume and strength of muscles and enhanced cooperation of the affected swallowing muscles, which will improve the swallowing capacity (Robbins, J., 2007).

Surface sEMG-guided therapy that incorporates systematic and progressively more challenging swallowing exercises generates superior clinical outcomes compared to sEMG-guided exercises that do not (Carnaby-Mann, G.D. et al., 2010).

PREVALENCE

Research done by ASHA (American Speech-Language and Hearing Association) shows that dysphagia is a very common condition having important medical as well as social impacts that drastically decrease a patient’s quality of life.

REPHAGIA: ADJUNCTIVE SURFACE ELECTORO MYOGRAPHY (sEMG)

There is an accumulating body of research in which sEMG is used for rehabilitation of swallowing disorders. Biofeedback from sEMG has been widely described to be effective improving both oral and pharyngeal aspects of the swallow (Crary & Groher, 2000).

IMPACT

The graph below summarizes the impact of the proposed protocol in one of our test locations. A total of 94 patients underwent treatment. On average, the patients improved 3 steps on the 7-point FOIS score. Brain trauma and Wallenberg patients improved the most (3.5 and 3.6 steps, respectively) and patients with Parkinson’s disease showed more moderate improvement (2 steps).

Each vertical line represents one patient. + Swallowing capability at the start of the treatment indicated on the FOIS scale

<table>
<thead>
<tr>
<th>Disease category</th>
<th>Prevalence of dysphagia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traumatic brain injury (TBI)</td>
<td>50-75%</td>
</tr>
<tr>
<td>Stroke</td>
<td>61%</td>
</tr>
<tr>
<td>Neurologic disease</td>
<td>50-75%</td>
</tr>
<tr>
<td>Emphysema</td>
<td>20-46%</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
<td>50%</td>
</tr>
</tbody>
</table>

silverfit rephagia

interested?

You can find more information on our website: www.silverfit.nl. Or contact us via e-mail: info@silverfit.nl or phone: +31 348 769 110

LITERATURE