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# Clinical Review of Physical Therapy Intervention of Swallowing Disorder after Stroke

Przegląd kliniczny terapią fizyczną zaburzenia polykania po udarze

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**Key words: physical therapy, stroke, dysphagia, swallowing disorder.**

**Słowa kluczowe: fizykoterapia, udar mózgu, dysfagia, zaburzenia polykania.**

**Abstract.** The article analyzes the mechanisms of swallowing due to violations of acute cerebrovascular accident. The methods of evaluation of dysphagia and its prevalence in the population. An overview of scientific evidence-based practice of physical therapy intervention in patients with dysphagia. Article focuses on the effectiveness of certain exercises and techniques to manage the consequences of dysphagia.

Dysphagia (from the dys and Greek phagēin – is swallow) – a disorder of the act of swallowing. Dysphagia very negatively affects the quality of life of the patient, leading to serious consequences on the part of the respiratory system, dehydration, cachexia.

According to the data of different authors, from 25 to 65% of patients admitted to inpatient treatment in the acute period have dysphagia. The highest incidence of dysphagia has in the environment of people of Asian origin. All the other races are affected equally.

Clinical overview of the research and evidence-based rehabilitation indicates that it is possible to apply the three receptions: Maneuver Mendelssohn; Maneuver Masako; Exercises Shaker.

**Conclusion.** For today it is used three kinds of exercises: maneuver Mendelssohn and Masako, exercises Shaker. Introduction to practical activities exercises for patients with dysphagia significantly improves the quality of life of the above-mentioned categories of the population.

**Streszczenie.** Artykuł analizuje mechanizmy zaburzenia połykania z powodu incydentu mózgowo-naczyniowego. Metody oceny zaburzeń połykania i jego występowania w populacji. Przegląd medycyny opartej na dowodach praktyki interwencji fizycznej terapii u pacjentów z zaburzeniami połykania. Artykuł skupia się na skuteczności niektórych ćwiczeń i technik do zarządzania konsekwencjami dysfagii.

Zaburzenia połykania (dysfagia: phagia – jeść, dys – trudność lub upośledzenie) – termin medyczny określający utrudnione przechodzenie pokarmu z jamy ustnej przez przełyk do żołądka. Dysfagia bardzo ujemnie wpływa na jakość życia pacjenta, co prowadzi do poważnych konsekwencji ze strony układu oddechowego, odwodnienie, wyniszczenie.

Według danych różnych autorów, od 25 do 65% pacjentów przyjmowanych do leczenia szpitalnego w ostrym okresie mają zaburzenia połykania. Największa częstość występowania zaburzeń połykania ma w środowisku osób pochodzenia azjatyckiego. Wszystkie inne rasy wpływa jednakowo.

Przegląd kliniczny badań i rehabilitacji opartej na dowody wskazują, że możliwe jest zastosowanie trzech przyjęć: manewr Mendelssohna; manewr Masako; ćwiczenia Shaker.

**Wnioski.** Do dziś jest używany trzy rodzaje ćwiczeń: manewr Mendelssohna; manewr Masako, ćwiczenia Shaker. Wprowadzenie do zajęć

praktycznych ćwiczeń dla pacjentów z zaburzeniami połykania znacznie poprawia jakość życia z wyżej wymienionych kategorii ludności.

**Statement of the problem.** Stroke – is the rapid loss of brain function due to disturbance in the blood supply to the brain and the violation of its functions.

Today scientists there are a significant reduction in the average age of the patients of this disease. It is noted that the natives of the regions of the former USSR, Eastern Europe, South and Central Asia have the greatest risk of stroke. The lowest risk was observed in the population of the countries of the Western Europe and the Pacific [7].

Dysphagia (from the dys and Greek phagéin – is swallow) – a disorder of the act of swallowing. Dysphagia very negatively affects the quality of life of the patient, leading to serious consequences on the part of the respiratory system, dehydration, cachexia.

According to the data of different authors, from 25 to 65% of patients admitted to inpatient treatment in the acute period have dysphagia [1]. The highest incidence of dysphagia has in the environment of people of Asian origin. All the other races are affected equally [6].

The work has been performed according to the Summary plan of scientific-research work in the sphere of physical culture and sport for the period of 2011-2015 on the topic 4.4: “Improvement of organizational and methodical bases of programming of the process of physical rehabilitation with dysfunctional violations in the various systems of the human organism”.

The task of the article is to analyze the clinical reviews of the scientific evidence-based practice in physical rehabilitation for determining effective exercises for patients with dysphagia.

**The results of the study.** Swallowing of the complex reflex action. During the day a person makes up to 1200 swallowing movements of which about 350 are not associated with the intake of food or water. The mechanism of swallowing is implemented in the form of a reflex circuit, which forms the reflex arch which consists of: sensitive fiber IX and X pairs of cranial nerves, sensitive kernel single path, motor dual core, motor fibers IX and X pairs of cranial nerves.

In order to better understand the mechanism of dysphagia, it is necessary to review the functioning of swallowing problems in the norm.

In the normal swallowing distinguish four phases of mechanisms swallowing [2]:

- oral phase;
- oral transfer phase;
- pharyngeal phase;
- esophageal phase.

Swallowing is a complex mechanism using both skeletal muscle (tongue) and smooth muscles of the pharynx and esophagus. The autonomic nervous system (ANS) coordinates this process in the pharyngeal and esophageal phases.

Oral phase. Prior to the following stages of the oral phase, the mandible depresses and the lips abduct to allow food or liquid to enter the oral cavity. Upon entering the oral cavity, the mandible elevates and the lips adduct to assist in oral containment of the food and liquid. The following stages describe the normal and necessary actions to form the bolus, which is defined as the state of the food in which it is ready to be swallowed.

Oral transfer phase. At the oral transfer phase, the food bolus has been formed and is ready to be propelled posteriorly into the pharynx. In order for anterior to posterior transit of the bolus to occur, orbicularis oris contracts and adducts the lips to form a tight seal of the oral cavity. Next, the superior longitudinal muscle elevates the apex of the tongue to make contact with the hard palate and the bolus is propelled to the posterior portion of the oral cavity. Once the bolus reaches the palatoglossal arch of the oropharynx, the pharyngeal phase,

which is reflex and involuntary, then begins. Receptors initiating this reflex are proprioceptive (afferent limb of reflex is IX and efferent limb is the pharyngeal plexus- IX and X). They are scattered over the base of the tongue, the palatoglossal and palatopharyngeal arches, the tonsillar fossa, uvula and posterior pharyngeal wall. Stimuli from the receptors of this phase then provoke the pharyngeal phase. In fact, it has been shown that the swallowing reflex can be initiated entirely by peripheral stimulation of the internal branch of the superior laryngeal nerve. This phase is voluntary and involves important cranial nerves: V (trigeminal), VII (facial) and XII (hypoglossal).

Pharyngeal phase. For the pharyngeal phase to work properly all other egress from the pharynx must be occluded – this includes the nasopharynx and the larynx. When the pharyngeal phase begins, other activities such as chewing, breathing, coughing and vomiting are concomitantly inhibited.

Esophageal phase. The upper esophageal sphincter closed, preventing the ingress of food in the respiratory tract, the food moves down in the stomach with the help of the smooth muscles. The duration of 8-20 seconds. Used X pair of cranial nerves.

Scale for evaluation of symptoms in the patient:

- 0 - no dysphagia (normal diet without restrictions);
- 1 - the ability to swallow liquid food and fluid;
- 2 - the ability to ingest only liquid;
- 3 - difficulty in swallowing liquids or saliva;
- 4 - full dysphagia.

To identify dysphagia use the following methods of research:

- Videofluoroscopic;
- Esophagoscopy and laryngoscopy.

Most of these techniques require expensive equipment and special training of staff and almost not available for use in regional hospitals.

Rockoshevska V.V. allocates the signs that indicate a high risk of problems emerged during the swallowing [3]:

- severe stroke (decrease in the level of consciousness, weakness, and loss of control over the body, aphasia, neglect);
- advanced age;
- a violation of consciousness;
- the weakness of the facial muscles (damage VII pair of cranial nerves);
- weak arbitrary cough or lack of it;
- damp or gurgling voice;
- data on infectious process in the lungs;
- reducing the sensitivity of the throat.

Physical therapy has a fairly frequently deal with this contingent of patients. If in the world model of a multidisciplinary approach to rehabilitation of the stroke patients is the specialty of the speech therapist, which is responsible not only for the work with aphasia, but also dysphagia.

Analyze clinical reviews about the possibility of physical therapy in dysphagia.

Clinical overview of the research and evidence-based rehabilitation indicates that it is possible to apply the three receptions [4]:

- Maneuver Mendelssohn;
- Maneuver Masako;
- Exercises Shaker.

The maneuver Mendelssohn provides for the lifting of the larynx or to use their hands during swallowing, or with the help of the muscles in the neck and try to hold the position for 2 sec., the number of repetitions – 5 times. The exercise is conducted without food in the oral cavity. The patient swallows his own saliva. This maneuver allows you to close the respiratory tract and open the esophagus for swallowing.

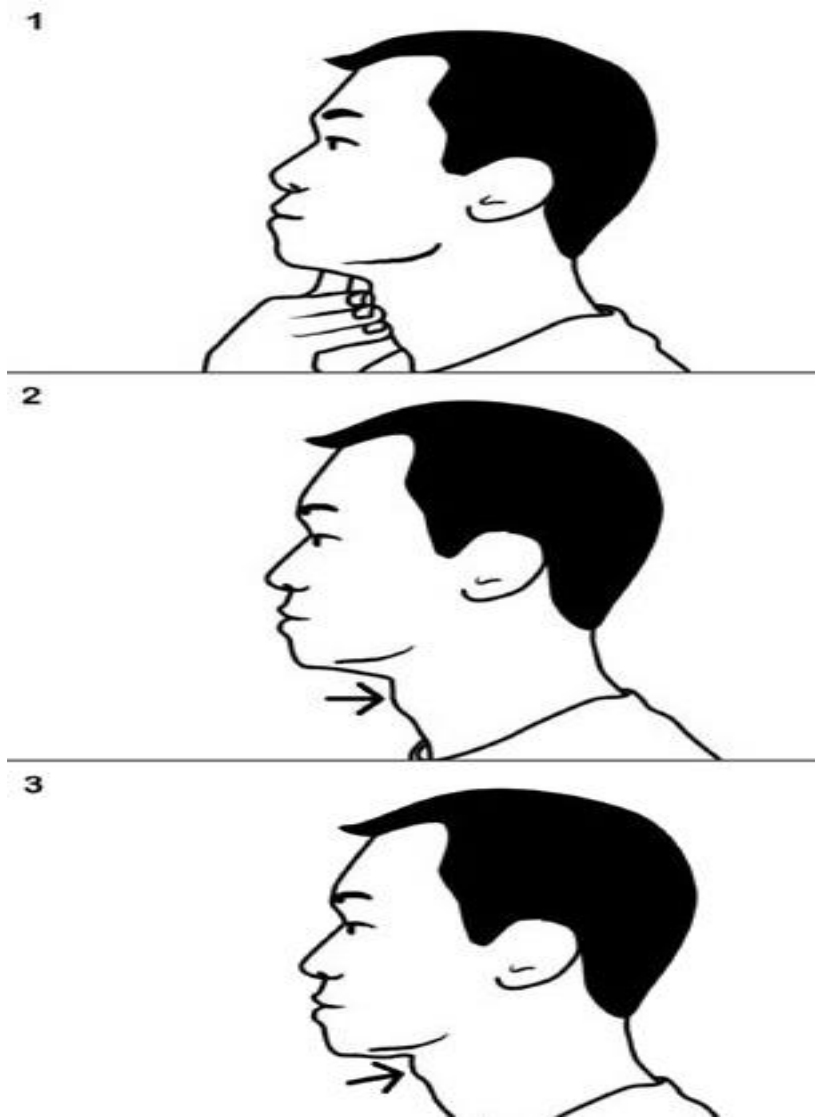
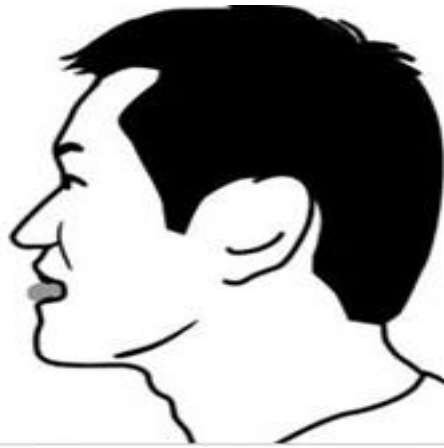


Fig. 1. The Maneuver Mendelssohn

The maneuver Masako is by the exercise and it cannot be used for swallowing nothing else but the saliva. For the implementation of the maneuver, you must extend the language between the front teeth and make swallowing movement. Such an exercise helps to strengthen the muscles of the pharynx, which are responsible for swallowing movement. Very often it causes inconvenience to patients.

1



2

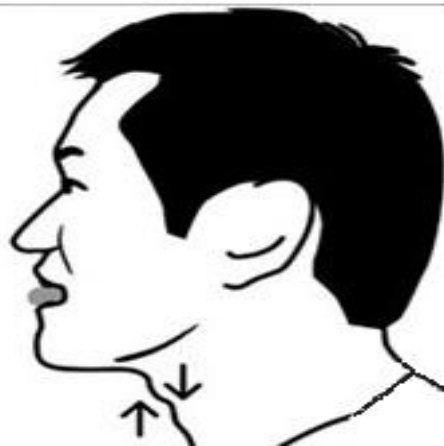


Fig. 2. The Maneuver Masako

Exercises Shaker provide two parts. First part:

- Lie down on the couch or smooth surface horizontally completely.
- Not taking shoulders from the surface of the bend his head and look at the toes.
- 60 seconds hold such a position, after which the next 60 seconds – the rest.
- Repeat three times.

The second part of the exercise Shaker:

- The initial position is the same, lying on the couch or the floor.
- Not taking his shoulders from the surface to bend his head and look at your toes and immediately lower his head.
- Repeat 30 times.

It is necessary to repeat the exercise Shaker from 5 to 10 times a day for several months.



Reviews of the scientific evidence-based practice confirm the effectiveness of the methods described above: head-lifting exercise for functional swallowing ability *Effective* [8].

It should be noted, that the main thing in the conduct of patients with dysphagia is the correction of the diet: exclusion from the diet of liquid food and its replacement in the jelly-like – jelly, mashed potatoes.

Thus the introduction of the own practice of scientific-evidence-based practice in respect of the patients, who have dysphagia will allow the physical therapist improve the quality of provided services.

**Conclusion.** For today it is used three kinds of exercises: maneuver Mendelsohn and Masako, exercises Shaker. Introduction to practical activities exercises for patients with dysphagia significantly improves the quality of life of the above-mentioned categories of the population.

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