# INPLASY PROTOCOL

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**None declared.**

# Effects of strengthening exercises on patients with oropharyngeal dysphagia following stroke A systematic review and meta-analysis

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**Review question / Objective:** **The aim of this review is to evaluate the effectiveness of strengthening exercises on patients with oropharyngeal dysphagia after stroke compared to conventional dysphagia treatment.**
**Condition being studied:** **Swallowing dysfunction is common after stroke, which is not only a risk factor for malnutrition, dehydration, and pneumonia, but also has a profound impact on stroke survivors discharge location. Suprahyoid muscle strengthening in dysphagia rehabilitation is an important therapeutic method. These strengthening exercises include head-lift exercise (HLE) also called Shaker exercise, chin tuck against resistance (CTAR) exercise, Iowa Oral Performance Instrument (IOPI) and so on. Most research focus on healthy people, the results showed these exercises can improve the swallowing function. But we want to know if these exercise have effective on dysphagia patients after stroke.**

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 January 2022 and was last updated on 04 January 2022 (registration number INPLASY202210014).

## INTRODUCTION

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strengthening exercises include head-lift exercise (HLE) also called Shaker exercise, chin tuck against resistance (CTAR) exercise, Iowa Oral Performance Instrument (IOPI) and so on. Most research focus on healthy people, the results showed these exercises can improve the swallowing function. But we want to know if these exercise have effective on dysphagia patients after stroke.

## METHODS

**Participant or population:** Post-stroke patients.

**Intervention:** Patients need to performed any of the below strengthening exercises, such as Shaker exercise, head lift exercise, chin tuck posture against resistance, Iowa Oral Performance Instrument, isometric lingual exercise, Tongue-to-palate resistance training, Tongue-strengthening exercises.

**Comparator:** Patients performed sham therapy or conventional dysphagia therapy, such as thermal tactile stimulation or compensatory strategies.

**Study designs to be included:** Randomized controlled trials.

**Eligibility criteria:** According to the purpose of this research we designed the inclusion criteria as the following: (1)Stroke patients over the age of 18 years. (2)Oropharyngeal dysphagia as diagnosed by VFSS, FEES or clinical examination. Exclusion criteria is that patients with dysphagia diagnosed prior to the stroke.

**Information sources:** It will be conducted in electronic database PubMed, Embase, Web of science, Cochrane Library and trial registers (Clinical Trials.gov). Taking the published literature are in English from the establishment of the database until to January 3, 2022.

**Main outcome(s):** Swallowing performance and safety are measured using penetration–aspiration scale (PAS), and functional oral intake scale (FOIS).

**Additional outcome(s):** Other scales: functional dysphagia scale (FDS), Video fluoroscopic dysphagia scale (VDS). Swallowing biomechanics: maximal excursion of the hyoid, tongue pressure, muscle strength of suprahyoid muscles by sEMG.

**Data management:** Studies will be screened initially according to the title and abstract by two authors independently, and those not meeting the criteria will be discarded. Disagreement will be resolved by discussion and referral to a third author if necessary. After this initial stage, the full text of all remaining studies will be reviewed by two authors independently for inclusion or exclusion in the final study. As before, disagreements will be resolved by discussion and referral to a third author if necessary. We will contact the authors if the information is unclear. The Excel sheet is used to record data.

**Quality assessment / Risk of bias analysis:** The risk of bias in included studies will be independently assessed by two review authors. We using the 'Risk of bias' tool for randomized trials. The assessment included: sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective outcome reporting, and other issues. For each domain, we will assign a judgement regarding the risk of bias as 'high', 'low' or 'unclear'.

**Strategy of data synthesis:** If sufficient trials are available and their populations and outcome measures are clinically similar, we will carry out meta-analyses of primary and secondary outcomes. We will use mean difference (MD) or standardised mean differences (SMD) and 95% CI for continuous outcomes. We plan to pool results with a random-effects model.

**Subgroup analysis:** If the included studies have significant statistical heterogeneity,

then the subgroup analysis will be conducted basing on varied parameters that affect the result parameters. These parameters contain the duration and frequency of the strengthening exercises and different kind of strengthening exercises.

**Sensitivity analysis:** To evaluate the reliability of our study results, sensitivity analysis will be used. If there is no significant change in the results after deleting the literature, it indicates that the sensitivity is low and our results are reliable. On the contrary, if there is a big difference or even an opposite conclusion after deleting the literature, it indicates a high sensitivity and a low reliability of this study results.

**Language:** English.

**Country(ies) involved:** China.

**Keywords:** Stroke, Oropharyngeal dysphagia, Systematic review, meta-analysis.

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