DOI: 10.48305/jrrs.2026.46591.1155 Published by Vesnu Publications

The Effectiveness of IQoro Screen Training on Oropharyngeal Function Related to Swallowing: A Systematic Review

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Review Article

Abstract

Introduction: There are various approaches to managing dysphagia. IQoro Screen Training (IQST) is a new technique that has recently gained researchers' attention. This treatment uses an Oral IQoro Screen device, which stimulates sensory input and muscle strength. This systematic review aimed to investigate the effect of IQoro Screen Training on oropharyngeal functions related to swallowing.

Materials and Methods: A search was conducted in PubMed, Scopus, Embase, Web of Science, Cochrane Library, and ProQuest databases through November 2022, and was updated in June 2023. Full-text studies published in English and investigating the effects of IQoro Screen Training on oropharyngeal functions related to swallowing were included. Studies that scored above 50% in methodological quality based on the Joanna Briggs Institute (JBI) and Single- case experimental design (SCED) forms were included in the data extraction phase.

Results: Following the screening of 67 records based on the predefined inclusion and exclusion criteria, 14 articles were selected, and after critical appraisal, 6 articles were included for data extraction. Among these, three were quasi-experimental studies, and one employed an SCED. The main objectives of these studies included investigating the effects of IQST on digestive disorders and dysphagia caused by neuromuscular defects, as well as its effects on the swallowing mechanism in healthy individuals.

Conclusion: The results of these studies indicated that IQoro screen Training has therapeutic potential in the treatment of swallowing disorders. However, there is still insufficient evidence to support its use in clinical settings. Therefore, further studies are needed to investigate the mechanism of this method on the swallowing process and the various muscles involved in swallowing.

Keywords: Dysphagia; Swallowing; Swallowing Disorder; Rehabilitation; Oral Screen

Citation: Gholami Z, Poorjavad M, Nouri R. **The Effectiveness of IQoro Screen Training on Oropharyngeal Function Related to Swallowing: A Systematic Review.** J Res Rehabil Sci 2024; 20.

Received date: 31.12.2023 Accept date: 04.02.2024 Published: 03.04.2024

Introduction

Swallowing is a critical physiological function essential for survival, ensuring the safe and efficient transport of nutrients and liquids through a complex sequence of physiological and biochemical processes (1). The mechanism of deglutition is highly intricate and is traditionally categorized into three primary phases: the oral, pharyngeal, and esophageal stages (1-3). These phases operate as a seamless continuum; consequently, dysfunction at any stage manifests as

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distinct clinical symptoms. Dysphagia, defined as an impairment in any of these swallowing phases, can lead to severe complications, including pulmonary aspiration and profound nutritional deficits (4-5). Among these, oropharyngeal dysphagia is the most prevalent form, affecting over 50% of the geriatric population and approximately 50% of patients with neurological disorders. Conversely, esophageal dysphagia is less common; however, it is clinically significant due to its association with the dysfunction of the enteric nervous system governing the esophagus (5).

To manage dysphagia, compensatory strategies—including dietary modification—as well as rehabilitative approaches, such as motor exercises and sensory stimulation, are commonly employed (7, 8). Recently, IQoro Training has emerged as a novel therapeutic technique garnering significant attention among swallowing specialists. This intervention uses a specialized device, the Oral IQoro Screen (Figure 1), engineered to stimulate sensory afferents and enhance the strength of the facial, oral, and pharyngeal musculature. Essentially, it serves as a neuromuscular training tool targeting the oro-facial and pharyngeal muscles. Furthermore, several studies have reported its efficacy in managing gastrointestinal disorders, such as gastroesophageal reflux disease (GERD) (9-11).



Figure 1. Oral IQoro Screen (13)

The procedural protocol involves placing the device intra-orally, positioned behind the teeth and with the lips closed. The patient then applies forward traction to the handle for 5 to 10 seconds. This maneuver is repeated three times, with a 3-second inter-maneuver interval (11) (Figure 2). To date, research on this method remains relatively sparse, and no systematic review has yet to synthesize the evidence on its effects across diverse studies. If sufficient evidence of its therapeutic efficacy is established, this approach could be widely integrated into speech-language pathology clinics. Consequently, the present study was conducted to evaluate the impact of IQoro Swallowing Training (IQST) on oropharyngeal functions related to deglutition. Specifically, this study aimed to synthesize existing evidence across various research designs, regardless of participants' demographic characteristics.

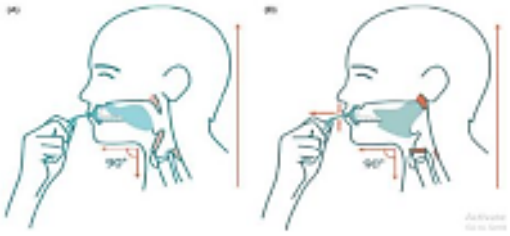


Figure 2. Positioning and implementation of the IQST procedure (13)

Materials and Methods

This systematic review was conducted at Isfahan University of Medical Sciences in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Figure 3). PubMed, Scopus, Embase, Web of Science, the Cochrane Library, and ProQuest were searched from inception through November 2022, with no publication date restrictions. Medical Subject Headings (MeSH) and Emtree terms were used to develop the search strategy. The search terms included "lip force," "oral screen," "IQoro," "oral neuromuscular training," "sialorrhea," "hypersialorrhea," "saliva*," "hypersaliv*," "feeding," "deglutition," "drool," "swallow," and "dysphagi*." These terms were combined using the Boolean operators AND and OR. To ensure a comprehensive search, grey literature was examined, and the reference lists of the included articles were searched manually. Furthermore, the database search was updated in June 2023 to identify the most recently published studies in this field.

Following the import of all identified abstracts into EndNote, duplicate records were removed. Two researchers independently screened the titles and abstracts of the remaining studies based on predefined inclusion criteria. Only studies specifically investigating the impact of IQST on oro-pharyngeal functions related to swallowing were selected for further review. Subsequently, the full texts of the eligible studies were retrieved and analyzed. Exclusion criteria consisted of review articles, studies published solely as procedural protocols, and those without available full-text versions or published in languages other than English and Persian. Any discrepancies between the two reviewers were resolved through consensus meetings.

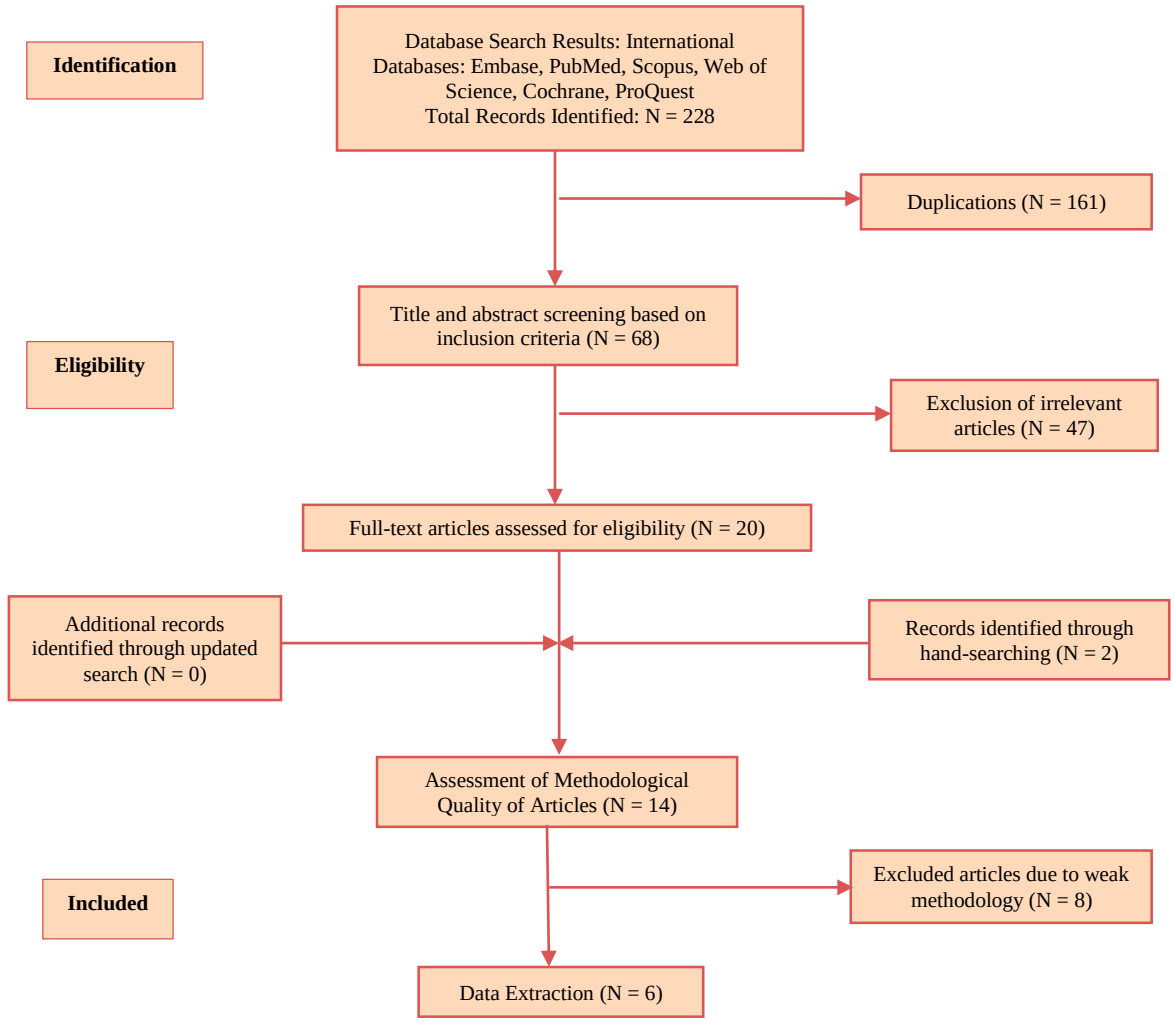


Figure 3. Search process for IQST-related literature

To assess the quality of quasi-experimental and clinical trial studies, the appropriate JBI critical appraisal tools were utilized based on the study design (12). Since the JBI does not provide a specific tool for single-case experimental designs (SCED), the SCED Scale (13) was employed to evaluate the methodological quality of these studies. Two independent reviewers conducted the quality assessment, and the results are presented in Tables 1-3 by study type. A score of 1 was assigned to 'Yes' responses, while 'No', 'Unclear', or 'Not Applicable' were scored as 0. Studies that met the criteria for 'Yes' in at least 50% of the items were considered to have adequate methodological quality and were included in the study (14). Finally, both reviewers independently screened the full text of the included articles.

Table 4 summarizes the extracted data, including the publication year, study location, study design, sample size, participant characteristics, intervention details, treatment duration, assessment tools, and study outcomes. To facilitate a more comprehensive synthesis of the findings, studies were categorized by objective, and results were reported descriptively.

Results

A preliminary search across six databases up to November 2022 yielded 228 studies. After removing 161 duplicates and screening the remaining articles based on the inclusion and exclusion criteria, 20 studies were selected. An additional two studies were identified through a manual search of the reference lists. Gray literature search and a search update in June 2023 did not yield any further eligible studies. Among these, the full texts of eight studies were unavailable. Consequently, 14 articles proceeded to the methodological quality assessment phase.

Table 1. Quality assessment results of clinical trial studies in the field of IQST based on the JBI checklist (Part I)

Clinical trial studies	Appropriate randomization method	Blind assignment to groups	Similarity of groups at the study's initiation	Blinding of participants	Blinding of Therapists	Blinding of evaluators	Standardization of all treatments and provided services
Owman-Moll et al. (17)	Unknown	Unknown	No	Unknown	Unknown	Unknown	Unknown
Hägglund et al. (18)	Unknown	Unknown	Unknown	Unknown	Unknown	No	Unknown
Hägglund et al. (19)	Yes	Yes	Unknown	Unknown	No	Yes	Unknown
Oki et al. (20)	Unknown	Unknown	Unknown	Unknown	N/A	Unknown	Yes

Table 1. Quality assessment results of clinical trial studies in the field of IQST based on the JBI checklist (Part II)

Clinical trial studies	Follow-up completion	ITT Analysis	Standardization of outcome measurements in all groups	Appropriate reporting of assessment reliability	Appropriate statistical analysis	Appropriate study design	Total score
Owman-Moll et al. (17)	Yes	Yes	Yes	Unknown	No	Yes	4
Hägglund et al. (18)	Yes	Yes	Unknown	Unknown	Yes	Yes	4
Hägglund et al. (19)	Yes	Unknown	Yes	Unknown	Yes	Yes	5
Oki et al. (20)	No	No	Yes	Unknown	Yes	Yes	4

ITT: Intension-to-treat

Table 2. Quality assessment results for quasi-experimental studies in the field of IQST using the JBI checklist

Quasi-experimental studies	Clear definition of independent variable	Matching of participants in two groups	Consistency across other treatments and provided services	Control group	Frequent assessments before and after treatment	Completion of follow-up period	Consistency of outcome measures in two groups	Appropriate reporting of assessment reliability	Appropriate statistical analysis	Total Score
Thüer et al. (21)*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unknown	No	5
Hägg & Anniko (22)*	Yes	Yes	Yes	No	No	Yes	Yes	Unknown	No	5
Hägg & Tibbling (23)	Yes	Unknown	Unknown	Yes	No	Yes	No	Unknown	No	3
Hägg & Tibbling (24)	Yes	Unknown	Unknown	Yes	No	Yes	No	Unknown	No	3
Hägg et al. (12)*	Yes	Yes	Yes	No	No	Yes	Yes	Unknown	No	5
Hägg et al. (25)	Yes	Yes	Unknown	No	No	Yes	Yes	Unknown	No	4
Hägg & Tibbling (13)*	Yes	Yes	Yes	No	No	Yes	Yes	Unknown	No	5
Franzen et al. (26)	Yes	Yes	Unknown	No	No	Yes	Yes	Unknown	No	4
Bengtsson et al.*	Yes	Yes	Yes	No	No	No	Yes	Yes	No	6

*Studies that scored above 50% were identified as having adequate methodological quality and proceeded to the data extraction phase.

Table 3. Quality assessment results of single-case experimental design studies in the field of IQST based on the SCED Scale (Part I)

Single-Subject Study design	Description of clinical history	Description of target behaviors	Description of design 1 including A-B-A phases or multiple-baseline design	Description of design 2: Baseline phase (pre-treatment phase)	Description of design 3: Treatment phase	Data recording
Sjögreen et al. (28)*	Yes	Yes	Yes	Yes	Yes	Yes

Table 3. Quality assessment results of single-case experimental design studies in the field of IQST based on the SCED Scale (Part II)

Single-Subject Study design	Reporting of inter-rater reliability	Independence of assessors	Appropriate statistical analysis	Replication	Generalization	Total Score
Sjögreen et al. (28)*	No	No	No	Yes	Yes	8

*Studies that scored above 50% were identified as having adequate methodological quality and proceeded to the data extraction phase.

Table 4. Summary of studies investigating the effects of IQST

Author(s)	Participant characteristics	Sample size	Intervention	Treatment duration and frequency	Assessment tools	Main findings
Studies investigating the effects of IQST on dysphagia associated with neuromuscular impairment						
Hägg and Anniko (22)	Patients with post-stroke oropharyngeal dysphagia, with a median age of 70 years, who were capable of oral feeding but had impaired swallowing capacity	30 patients: 24 with facial weakness and 6 without facial weakness	Lip-strengthening exercises using an oral screen	At least 5 weeks; three sessions per day	LF; SC	Significant improvements in lip strength and swallowing capacity were observed in all participants, regardless of age, sex, or the interval between stroke onset and treatment initiation. The magnitude of improvement in lip strength did not differ significantly between patients with and without facial weakness.
Sjögreen et al. (28)	Individuals aged 7–19 years with myotonic dystrophy type 1 (DM1)	8 participants	Lip-strengthening program using an oral screen	16 min/day, 5 days/week, for 16 weeks	Lip strength; lip endurance; lip movements during facial expressions; bilabial and labiodental speech sound production; ability to manage saliva and to eat and drink	Lip strength increased significantly in 50% of the participants. However, because these participants did not have severe impairments in eating, drinking, or saliva control, the effect of this improvement on swallowing function could not be determined.
Hägg & Tibbling (13)	Patients with post-stroke oropharyngeal dysphagia, with a median age of 68 years, who were at least 1 month post-stroke	26 patients: Group A, n = 15; Group B, n = 11	Group A: IQS treatment initiated at least 6 months after stroke; Group B: IQS treatment initiated within 1 month after stroke	3 months	PCCM; PASS; LF; SCT	In both groups, all outcome measures improved significantly immediately after treatment compared with pretreatment values. In both groups, SCT scores also remained significantly higher than pretreatment values at follow-up.
Studies investigating the effects of IQST on the activation of swallowing-related muscles in healthy individuals						
Thüer and Ingervall (21)	Children with a mean age of 9 years and 3 months who had a short upper lip and proclined maxillary incisors	16 participants	Lip-strength and lip-pressure training using an oral screen	10 min/day for 8–10 months	Lip-strength measurement using a pom-meter; measurement of lip pressure against the maxillary and mandibular incisors during rest, chewing, and swallowing	At the end of treatment, lip strength and lower-lip pressure against the teeth during chewing had increased significantly relative to baseline. No significant changes in lip pressure at rest or during swallowing were observed across the pretreatment, post-treatment, and follow-up assessments.
Bengtsson et al. (27)	Healthy adults aged 45–59 years without dental occlusal, swallowing, speech, or oral-motor disorders	10 participants	Application of three different oral-screen exercise protocols and comparison with dry swallowing	Single-session assessment	LF; sEMG; VFS	During oral-screen exercises, the lip muscles exhibited greater activity than the other muscle groups. Muscle-activation patterns varied across participants. Compared with dry swallowing, oral-screen use was associated with smaller movement amplitudes of the tongue base, posterior pharyngeal wall, and larynx. No significant differences in the movement amplitudes of these structures were found among the three oral-screen protocols.

Table 4. Summary of studies investigating the effects of IQST (continue)

Author(s)	Participant characteristics	Sample size	Intervention	Treatment duration and frequency	Assessment tools	Main findings
Studies investigating the effects of IQST on dysphagia associated with gastrointestinal disorders						
Hägg et al. (12)	Individuals with esophageal dysphagia who had received proton-pump inhibitor (PPI) therapy for more than 1 year without improvement in dysphagia or reflux symptoms	43 participants: Group A, 21 participants with hiatal hernia, median age 52 years; Group B, 22 participants without hiatal hernia, median age 57 years	Lip-strengthening exercises using an oral screen	6–8 months	Questionnaire assessing symptoms of hiatal incompetence; visual analog scale (VAS) assessing the ability to swallow food; LF; VCT; measurement of diaphragmatic pressure in the hiatal canal and upper esophageal sphincter (UES) in 12 patients with hiatal hernia	In the overall sample and both subgroups, esophageal dysphagia, reflux symptoms, and VAS scores decreased significantly after treatment, whereas VCT and LF increased significantly. Resting pressures in the UES and hiatal canal were significantly lower than the pressures recorded while participants pulled on the IQS.

LF: Lip Force, SC: Swallowing Capacity, DM1: Myotonic Dystrophy type 1, PCCM: Postural Control According to Castillo Morales, PASS: Postural Assessment Scale for Patients with Stroke, SCT: Swallowing Capacity Test, sEMG: surface Electromyography, PPI: Proton Pump Inhibitor, VFS: Video fluoroscopy, VAS: Visual Analogue Scale, VCT: Velopharyngeal Closure Tests, UES: Upper Esophageal Sphincter

This assessment was conducted using the JBI and SCED Scale checklists, ultimately resulting in the extraction of data from six studies. The remaining articles (four randomized controlled trials and four quasi-experimental studies) were excluded from the data extraction phase due to inadequate methodological quality (Figure 1). The majority of the included publications were quasi-experimental (9 out of 14), while only one study employed a single-case experimental design (SCED). Tables 1, 2, and 3 present the quality assessment results for the RCTs, quasi-experimental, and SCED studies, respectively.

As detailed in Table 1, none of the randomized controlled trials adhered to the criteria for baseline comparability between groups, appropriate blinding of participants and therapists, or reporting of assessment reliability. Only one RCT implemented four methodological items: allocation concealment, appropriate randomization, blinding of assessors (17), and standardization of all treatments and services provided (18) (Table 1). Regarding the quasi-experimental studies, seven were single-group pre-post designs without a control group, indicating lower methodological quality than those with control groups. Only one quasi-experimental study (25) reported the reliability of the assessments. Furthermore, none of the studies in this group performed repeated pre- and post-treatment assessments to ensure participant stability, nor did they report statistical indices such as test assumptions, effect sizes, or statistical power (Table 2).

Study Characteristics

Table 4 summarizes the characteristics and findings of the six studies that ultimately proceeded to the data extraction phase. The primary objectives of these studies included evaluating the effect of IQST on dysphagia resulting from neuromuscular impairments, dysphagia associated with gastrointestinal diseases, and the activation of swallowing-related muscles in healthy individuals; these are described separately below.

Effect of IQST on Neuromuscular Dysphagia

A total of seven studies investigated the effect of IQST on dysphagia resulting from disease or neuromuscular impairments (11, 16, 17, 20-22, 26). Following the methodological quality assessment, only three studies remained: two conducted in patients with post-stroke dysphagia (11, 20) and one in patients with myotonic dystrophy (26).

Hägg and Aniko (2008) (20) examined the effect of the Oral Screen on 30 patients with oral-pharyngeal dysphagia post-stroke. Of these, 24 patients presented with unilateral central facial weakness. Participants placed the Oral Screen in their mouths, pulled the handle horizontally for 5–10 seconds, and resisted its expulsion by tightening their lips and pressing their heads against the back of the chair. This exercise was performed three times daily before each meal, with three repetitions per session, for a minimum duration of five weeks. The results indicated statistically significant increases in median lip strength and median swallowing capacity. These improvements were independent of age, gender, and the interval between stroke and treatment onset. In all patients with facial weakness, symptoms were either resolved or improved following the intervention.

In a subsequent study, Hägg and Tibbling (11) evaluated the long-term effect of IQST on post-stroke dysphagia and examined its impact on patients' postural control. While the exercise protocol and frequency were identical to those in the study by Hägg and Aniko (2008) (20), the treatment duration was extended to three months for all patients. Lip strength and swallowing capacity improved immediately after treatment and remained stable throughout the follow-up period (13–16 months post-intervention). Both groups demonstrated significant improvement in postural control and oral-pharyngeal motor functions after IQS intervention. Furthermore, five patients who were PEG-fed prior to treatment transitioned to oral feeding, with four of them successfully achieving this goal.

Based on the positive impact of the Oral Screen on lip strength reported in previous studies (11, 20), Sjögreen et al. (26) conducted a study on patients with Type 1 Myotonic Dystrophy. The objective was muscular strengthening to delay muscle atrophy and improve lip function in speech production, eating and drinking skills, and saliva control. Participants performed 6 minutes of active exercise and 10 minutes of passive exercise with the Oral Screen, 5 times per week for 16 weeks. The results showed improvement in lip strength in half of the patients; however, no statistically significant difference was observed between pre- and post-treatment. Although lip endurance increased in most patients, drawing a definitive conclusion was challenging because it depends on lip strength, which varies among individuals. Since participants did not exhibit significant difficulties with saliva control or eating and drinking, the impact of Oral Screen exercises on these functions could not be determined. Specifically, only one individual experienced difficulty holding food with the lips while using a spoon, which resolved after treatment but recurred after the intervention ended.

Effect of IQST on the Activation of Swallowing Muscles in Healthy Individuals

Four studies (15, 18, 19, 25) investigated the effect of the Oral Screen on the muscles involved in

swallowing, of which two exhibited relatively adequate methodological quality (19, 25). Thüer and Ingervall (19) examined the impact of increased lip strength using the Oral Screen on the pressure exerted by the lips against the teeth during swallowing and chewing in children with a short upper lip and maxillary incisors. Participants practiced with the Oral Screen for 10 minutes daily, following a protocol similar to that of Hägg and Aniko (20), over an 8–10-month treatment period. Assessments were conducted at three time points—baseline, post-treatment, and during follow-up—measuring lip strength and the pressure of the lips against the upper and lower incisors during rest, chewing, and the swallowing of a piece of bread. The median lip strength, measured with a pom-meter, increased from 145 g to 245 g following treatment; however, it decreased significantly immediately after the intervention. No significant changes were observed in lip pressure during rest or swallowing across the three assessment periods. Only the lower lip pressure during chewing showed a significant increase post-treatment compared to baseline, which subsequently decreased significantly during the follow-up period relative to the immediate post-treatment phase.

Bengtsson et al. (25) investigated the effect of the Oral Screen on lip strength and the activity and movement of muscles involved in swallowing in healthy individuals. In this study, participants followed three different Oral Screen protocols: 1) maintaining the Oral Screen between the lips and teeth while keeping the tongue in a neutral position without active suction; 2) placing the Oral Screen between the lips and teeth while pressing the tip of the tongue against the gingival walls; and 3) placing the Oral Screen between the lips and teeth with active suction. The movement of swallowing structures was evaluated via videofluoroscopy and compared with dry swallowing. The activity of the submental, left masticatory, and orbicularis oris muscles was recorded using surface electromyography (sEMG).

The results, which measured the tool's immediate effect, indicated that the highest lip strength was achieved under protocol 3. Videofluoroscopy results revealed that activation patterns of various structures varied among participants, and there were no significant differences in range of motion across the three protocols. According to the sEMG findings, the highest activity was observed in the lower lip, followed by the upper lip. Only the submental muscle activity level differed significantly among the three protocols, with the highest activity observed during active suction.

Effect of IQST on Dysphagia Associated with Gastrointestinal Diseases

Three studies investigated the effect of IQST on dysphagia caused by gastrointestinal diseases (10, 23, 24), but only Hägg et al. (10) demonstrated relatively adequate methodological quality. This study was conducted on 43 individuals with esophageal dysphagia (characterized by the sensation of food sticking in the chest), both with and without hiatal hernia. The intervention protocol was identical to that of the previous studies by Hägg and Aniko (20), although the treatment duration was extended to 6–8 months. According to the Visual Analogue Scale (VAS), the patients' swallowing ability improved following the intervention. Based on the hiatal insufficiency questionnaire—which included items on chest tightness during meals, chest acidity, and gastric acid reflux—86% of participants initially exhibited reflux symptoms, which significantly improved after the IQST exercises. Furthermore, high-resolution manometry (HRM) results revealed that during the stretching of the Oral Screen, both the diaphragmatic pressure and the upper esophageal sphincter (UES) pressure were significantly higher than in the resting state.

Discussion

Given the increasing interest among therapists in incorporating therapeutic tools within speech-language pathology, and considering the objective nature and ease of application of such tools—particularly for patients with cognitive impairments—as well as the limited rehabilitative options for gastrointestinal disorders such as reflux, the present study was conducted to evaluate the effect of IQST on swallowing-related oral-pharyngeal functions. By conducting a rigorous methodological quality assessment, the strengths and weaknesses of each study were identified, providing valuable guidance for future research.

The results of this study indicate that although research on the effect of IQST on oral-pharyngeal functions began in the 1980s, there was a prolonged hiatus in the literature until the field regained research attention after 2008. While the impact of IQST has been examined across neuromuscular impairments, healthy individuals, and gastrointestinal disorders, reaching a definitive conclusion remains challenging due to the heterogeneity among the studies. Furthermore, more than half of the identified publications (8 out of 14) were excluded due to significant methodological flaws. Even among the remaining studies, several methodological

shortcomings were evident. Specifically, the lack of control groups, the absence of repeated pre- and post-treatment assessments, and the failure to report statistical indices and reliability estimates were common limitations across the quasi-experimental studies. These gaps highlight critical areas that must be addressed in future research to ensure more robust and reliable findings.

According to Table 4, three studies investigated the effect of IQST on neuromuscular dysphagia: two in post-stroke patients (11, 20) and one in patients with myotonic dystrophy (26). In the study by Hägg and Aniko (20), lip strength and swallowing capacity improved regardless of facial muscle weakness, age, gender, or the duration of dysphagia prior to treatment, despite variability in treatment onset and duration. The authors suggested that training with the Oral Screen stimulates tactile receptors in the oral region and enhances motor function for lip closure, increasing the activity of the buccinator muscles and the floor of the mouth. Furthermore, they proposed that it increases negative intraoral pressure, thereby enhancing lip strength and improving swallowing capacity. However, these claims were presented without sufficient empirical evidence, suggesting that the proposed mechanism of action may not be fully substantiated.

In a subsequent study by Hägg and Tibbling (11), postural control was also evaluated alongside lip strength and swallowing capacity. The results indicated significant improvements in all three domains. The authors hypothesized a potential interaction between postural control and the control of oral structures, suggesting that neuronal clusters adjacent to a lesion in the sensorimotor areas may gradually assume the functions of damaged neurons. It is worth noting, however, that while the power analysis for this study indicated a required sample size of 66 participants to achieve 80% power, the study was completed with only 26 participants, limiting its statistical reliability.

In a study of patients with myotonic dystrophy (26), the intervention improved lip strength in 50% of participants. However, since these individuals did not exhibit significant impairments in eating, drinking, or saliva control, the effect of the Oral Screen on these specific skills remained indeterminate. This suggests that "the presence of dysphagia" should have been established as a primary inclusion criterion for this study.

Regarding the two studies conducted in healthy individuals (19, 25), no clear or consistent mechanism of action for treating swallowing disorders was identified. In the study involving children with a short upper lip (21), although lip strength increased, it did not increase lip pressure against the teeth during rest or swallowing. The only significant difference was the lower lip pressure during chewing, which increased significantly post-treatment but returned to baseline during follow-up. Bengtsson et al. (25) evaluated the movement and activity of swallowing muscles using different Oral Screen protocols. By observing a reduced range of motion in swallowing structures compared to dry swallowing, noting variability in movement patterns across participants, and applying the principle of specificity in therapeutic exercise (27), they concluded that such exercises likely have a minimal effect on swallowing. They suggested that the only plausible mechanism explaining the benefits observed in previous studies is increased lip strength, which facilitates better lip closure during swallowing. Additionally, Bengtsson et al. (25) concluded that different application protocols did not significantly impact the movement of the structures involved in swallowing.

Following the methodological quality assessment, only one study focusing on esophageal dysphagia and reflux symptoms proceeded to data extraction (10). The results indicated that Oral Screen exercises could be effective in reducing esophageal dysphagia symptoms in both groups with and without hiatal hernia by influencing striated muscles, such as the upper esophageal sphincter and the diaphragm.

Limitations

The present study is the first systematic review to investigate the effect of IQST on swallowing-related oral-pharyngeal functions. While these findings serve as a guide for future research, certain limitations must be acknowledged. These include the exclusion of studies published in languages other than English and the restriction of the search to six databases.

Recommendations

The majority of the reviewed studies exhibited serious methodological flaws. Furthermore, studies with similar objectives used inconsistent Oral Screen application methods, dosages, and treatment durations, complicating the interpretation of results and the formulation of general conclusions. It is recommended that future research standardize these parameters to enhance comparability and validity.

Conclusion

The findings of the present study indicate that this therapeutic approach has significant potential for treating oropharyngeal and even esophageal dysphagia. However, there is currently insufficient evidence to support its implementation in clinical

settings. Therefore, further high-quality studies are required to more accurately investigate the mechanisms of action of this treatment on the swallowing process and the various muscles involved in deglutition.

Acknowledgments

The authors gratefully acknowledge the financial support provided by Isfahan University of Medical Sciences for conducting this review study (Grant No. 3401238). The authors declare that they have no conflicts of interest related to this study.

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Funding

This article was derived from the Master's thesis of Zohreh Gholami at Isfahan University of Medical Sciences (Research Project No. 3401238; Ethics Code: IR.MUI.NUREMA.REC.1401.059). The study was financially supported by Isfahan University of Medical Sciences, and the authors sincerely acknowledge its financial and institutional support.

Conflict of Interest

The authors did not have a conflict of interest.

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