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Review Article

The Effect of Facial Expression Gymnastics and Oral Motoric Exercise in Supporting Communication in Stroke Patients: A Literature Review

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Abstract

Background: Stroke is a neurological disorder that frequently leads to facial muscle weakness, dysarthria, articulation impairment, and reduced communication ability. Rehabilitative interventions such as facial expression exercises and oral motor exercises are commonly used to stimulate orofacial muscles and support recovery of communication functions.
Objective: This literature review aims to analyze the effects of facial expression exercises and oral motor exercises on communication abilities in stroke patients.
Methods: A literature search was conducted across PubMed, Scopus, ScienceDirect, CINAHL, and Google Scholar for studies published between 2000 and 2025. Articles were selected based on predefined inclusion criteria, and twelve relevant studies were analyzed using a narrative synthesis approach.
Results: The findings indicate that facial expression exercises and oral motor exercises are associated with improvements in facial muscle strength, lip and tongue coordination, articulation clarity, and speech intelligibility. Some studies also report improvements in swallowing function; however, these outcomes are distinct from communication measures. Technology-assisted interventions, including speech therapy applications, show potential as complementary tools, although the evidence remains limited.
Conclusion: Orofacial exercises appear to be safe and feasible interventions that may contribute to improved communication outcomes in stroke patients. However, the strength of evidence varies across studies, and further high-quality research is needed before recommending widespread or routine implementation.

Keywords: Communication, Facial Expression Exercises, Oral Motor Exercises, Stroke, Orofacial Rehabilitation

INTRODUCTION

A stroke is a neurological emergency that occurs due to a disruption in blood flow to the brain, either due to a blockage (ischemic stroke) or a rupture of a blood vessel (hemorrhagic stroke), causing rapid death of brain cells (1). Stroke is defined as "a sudden onset of focal or global neurological deficits due to impaired cerebral circulation lasting more than 24 hours" (AHA/ASA, 2022). This condition often leads to significant physical and cognitive disabilities (2).

The WHO (2023) reports that more than 15 million cases of stroke occur each year, and about 5 million people experience permanent disability (3) . In Indonesia, the prevalence of stroke based on Riskesdas (2018) reached 10.9 per 1,000 population, making it one of the non-communicable diseases with the highest burden (4). The disorders caused are not only in the body's motor skills, but also in facial expressions, speech articulation, and oromotor functions, which are very important in the daily communication process (5).

Various risk factors play a significant role in the onset of stroke, including hypertension, diabetes mellitus, hypercholesterolemia, smoking, a history of heart disease, obesity, lack of physical activity, and advanced age (6). Hypertension is the most dominant factor, with approximately 80% of ischemic stroke patients having a history of high blood pressure (7). Lifestyle factors such as high salt intake, chronic stress, alcohol consumption, and a high-fat diet also increase the risk of stroke (8). At the population level, demographic changes and increased life expectancy have led to an increase in the number of individuals with chronic diseases, so the incidence of stroke is predicted to continue to increase from year to year (9).

Stroke complications often have long-term effects and affect various aspects of life (1). In addition to limb paralysis, patients may also experience cognitive impairment, balance disorders, dysphagia, dysarthria, and facial expression disorders due to damage to the motor center and cranial nerves (10). Other complications such as aspiration pneumonia, swallowing disorders, and loss of oral control can worsen the patient's condition. More than 30–60% of stroke patients experience speech disorders, while facial muscle weakness is recorded in more than 70% of cases (2). These disorders cause patients difficulty in producing sounds, moving their tongues, closing their lips, and expressing emotions through their faces, which significantly impacts the patient's ability to communicate and their quality of life (11).

Brain damage caused by stroke can affect the nerve pathways that control facial expressions, swallowing, and verbal articulation. The motor cortex area that controls the muscles of the face and oral cavity is often affected, resulting in decreased muscle tone, facial asymmetry, drooling, and difficulty in forming basic phonemes. This condition is exacerbated by complications such as dysphagia, tongue weakness, and oromotor muscle coordination disorders. As a result, patients experience limitations in conveying verbal and nonverbal messages (5). If rehabilitation is not carried out quickly and appropriately, these complications can become permanent and reduce the patient's ability to adapt to their social environment.

Post-stroke rehabilitation should not only focus on extremity motor recovery but also include improvement of facial and oromotor functions. Facial Expression and Oral Motoric Exercise are non-pharmacological interventions proven effective in reducing the impact of complications such as facial muscle weakness and articulation disorders (12). These exercises consist of structured movements such as raising the eyebrows, moving the lips, blowing, moving the tongue, and strengthening the cheek muscles. The repeated stimulation provided through these exercises helps increase muscle tone, improve facial symmetry, and strengthen phonation and articulation abilities (13).

Several previous studies have shown that facial expression and oral motor exercise interventions can significantly improve patients' communication function. Destriana's (2022) study mentioned that subjects classified as H-B IV (moderately severe) using the Sunny Brook Composite Score experienced a decrease in face dropping to grade III (mild dysfunction) after undergoing facial massage for 5 days. Research by Septiasih et al. (2023) showed an improvement in verbal communication skills, from a pre-test average of 5.39 to a post-test average of 6.07.

This rehabilitation approach is in line with the concept of neuroplasticity, which is the brain's ability to reshape neural pathways through repeated sensorimotor exercises. Facial Expression and Oral Motoric Exercises can activate healthy areas of the brain and encourage neural network reorganization. Thus, these exercises not only improve muscle function but also enhance patients' ability to produce sounds, form words, and convey emotional expressions (14). Due to its safe, inexpensive, and self-administered nature, this intervention is a highly suitable option for both short-term and long-term rehabilitation.

Given the high incidence of communication disorders in post-stroke patients and the impact of complications on social functioning and quality of life, this literature review is important to

compile. This study aims to compile the latest scientific evidence on the effectiveness of Facial Expression and Oral Motor Exercises in supporting communication abilities, thereby providing a basis for the development of comprehensive and applicable rehabilitative interventions for stroke patients.

METHODS

This study employed a structured literature review approach to examine the effects of facial expression exercises and oral motor exercises on communication outcomes in stroke patients. The review process was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines to ensure methodological transparency and reproducibility.

Search Strategy

A comprehensive literature search was conducted across six electronic databases: PubMed, Scopus, ScienceDirect, CINAHL, Cochrane Library, and Google Scholar. The search covered studies published between January 2020 and March 2025 to ensure the inclusion of recent evidence.

Search strategies were adapted for each database using controlled vocabulary and free-text terms combined with Boolean operators. The core search string was as follows:

("facial exercise" OR "facial expression therapy" OR "facial rehabilitation") AND ("oral motor" OR "oromotor exercise" OR "oral motor therapy") AND ("stroke" OR "post-stroke rehabilitation") AND ("communication" OR "speech intelligibility" OR "dysarthria").

Reference lists of selected articles were also screened to identify additional relevant studies.

Study Selection Process

All retrieved articles were exported into Mendeley reference manager, where duplicate records were identified and removed automatically and manually. The study selection process followed the four stages of the PRISMA flow diagram. Duplicate records were identified and removed using both automated and manual procedures. The study selection process followed the four stages of the PRISMA flow diagram. In the identification stage, all records retrieved from database searches were compiled. During the screening stage, titles and abstracts were independently reviewed by two reviewers to exclude studies that were clearly irrelevant. In the eligibility stage, full-text articles were assessed against predefined inclusion and exclusion criteria. Finally, studies that met all criteria were included in the analysis. Any disagreements between reviewers during the screening and eligibility phases were resolved through discussion, and when consensus could not be reached, a third reviewer was consulted to make the final decision.

Exclusion Criteria

Studies were excluded if they were not published in English, were review articles, editorials, conference abstracts, or case reports, focused exclusively on swallowing (dysphagia) without reporting communication outcomes, or involved pediatric populations (Table 1).

Table 1. Inclusion Criteria Based on PICOS

PICOS	Criteria
Problem	Stroke patients with communication disorders (aphasia, dysarthria, stroke-induced speech disorders), aged ≥ 18 years
Intervention	Facial Expression Exercise, Orofacial Exercise, Oral Motoric Exercise, Lip exercise, Tongue exercise, Neuromuscular oral training, other orofacial therapies aimed at improving communication
Control	No control group or comparative intervention
Outcome	Changes in verbal communication ability, articulation, speech ability, oromotor function, oral muscle strength, facial expression, or communication-related responses
Study Design	RCT, quasi-experimental, pre-experimental, clinical trial, cohort, case-control, and literature review

Quality Appraisal

The methodological quality of the included studies was assessed using standardized critical appraisal tools appropriate to each study design. The Joanna Briggs Institute (JBI) Critical Appraisal Tools were applied for quasi-experimental and observational studies, while the Cochrane Risk of Bias Tool (RoB 2) was used for randomized controlled trials. Each study was evaluated independently by two reviewers. The results of the quality assessment were used to inform the interpretation of the evidence, rather than as criteria for exclusion.

Data Extraction and Synthesis

Relevant data were extracted using a standardized data extraction form, including author, year of publication, study design, sample characteristics, intervention details, outcome measures, and key findings. Due to heterogeneity in study designs, interventions, and outcome measures, a narrative synthesis approach was employed. The findings were organized according to types of intervention and specific communication outcomes to facilitate structured comparison and interpretation.

RESULTS

A total of 58 articles were found based on a search using predetermined keywords in the Google Scholar, PubMed, ProQuest, Elsevier, and ScienceDirect databases. After screening the titles and abstracts, there were 42 articles that matched the research topic. The duplication removal process resulted in 22 articles for further review. Based on a feasibility evaluation using the PRISMA approach, 12 journals were found to meet the criteria and were deemed suitable for further analysis.

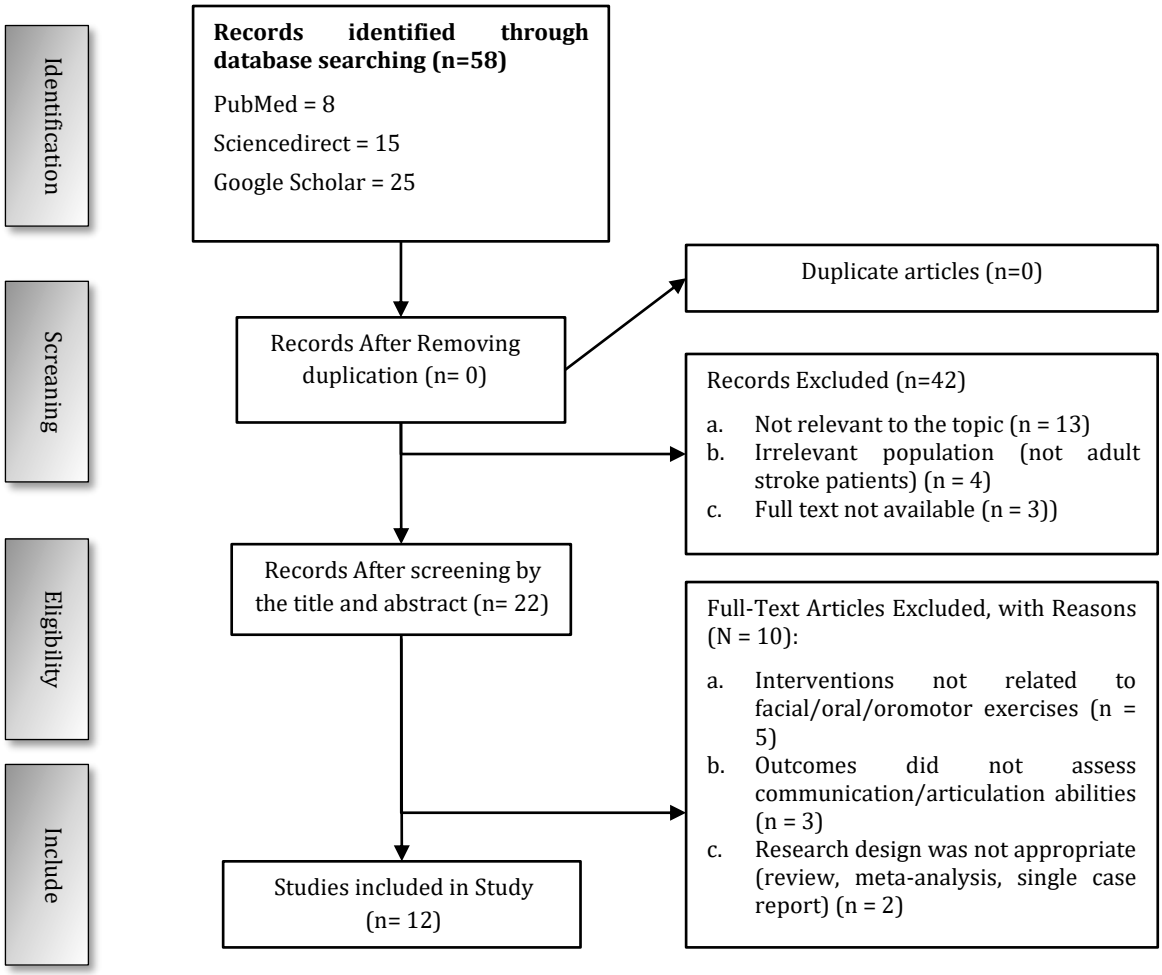

Figure 1. PRISMA Flow Chart

The information obtained from the selected articles included the author's name, year of publication, country where the research was conducted, research design, intervention provided, duration of implementation, and research results summarized in Table 2.

Tabel 2. Characteristics and Key Findings of Included Studies

Title, Year	Method, Sample	Intervention	Duration	Results (research details)
Improving Verbal Communication After Lip Exercise and Blowing Pipe (15).	Pre-experimental, pre-post; 21 stroke patients	Lip exercises and blowing pipe	20 minutes/day, 5 days/week for 2 weeks	Improved articulation, breath control, and verbal communication; effective and low-cost intervention
Efektivitas Mirror Therapy terhadap Kemampuan Bicara Pasien Pasca Stroke dengan Afasia Motorik (16).	RCT; 16 patients with dysarthria (8 experimental, 8 control)	Mirror therapy (tongue, lip, and articulation exercises in front of a mirror)	2 weeks, 6 sessions	Significant improvement in speech ability; mirror therapy is effective for motor aphasia.
Effects of Oromotor Exercises for Dysarthric Speech (17).	Pre–post experimental, 4 patients with post-stroke dysarthria	*Oro-motor exercises (tongue and lip movements)*	10 sessions, 45 minutes/session, 3 times a day	Improved intelligibility and decreased Formant Centralization Ratio → improved articulation.
Efektivitas Terapi Wicara "Aiueo" Dan Melodi Intonasi Terapi Terhadap Peningkatan Kemampuan Berbahasa Pasien Stroke Dengan Afasia Motorik Di Ruang Cherry RSUD Cengkareng (18)	Quasi-experiment; two-group pre–post without control	AIUEO, Melody Intonation Therapy, and a combination of both	3 months	Significant improvement in language skills; the combination of AIUEO + MIT was most effective ($p<0.05$).
Terapi Wicara Berpengaruh terhadap Kemampuan Komunikasi Verbal Pasien Pasca Stroke dengan Afasia (19).	Quasi experiment, One Group Pre-Post Test Design, n=28	Speech Therapy	6 months	There was an increase in verbal communication skills (pre-test average 5.39 → post-test 6.07). The Paired t-Test showed a significant effect ($p = 0.000$).
Smartphone-Based Speech Therapy for Poststroke Dysarthria: Pilot Randomized	Randomized Controlled Trial	Smartphone-based speech therapy app	1 hour/day, 5 days/week, for 4 weeks	Significant improvement in speech intelligibility, articulation (correct consonants),

Controlled Trial Evaluating Efficacy and Feasibility (20).	(Evaluator-blinded)			reduction in dysarthria severity, and improvement in quality of life. Adherence 64%, high usability score (80.78).
Efektivitas Terapi Wicara dengan Stimulasi Multimodal untuk Meningkatkan Kemampuan Bahasa Ekspresif pada Pasien Afasia (21).	Pre–post test (pre-experimental), 5 patients with aphasia	Speech therapy using a multimodal stimulation approach	10 therapy sessions	Expressive language scores increased significantly from an average of 19% to 85.6%. The improvement was mainly in the ability to name words and form sentences.
Assessment of the Effectiveness of Facial Expression Exercises Stimulation Using Mirror Media in Increasing Facial Muscle Strength in Hemiparetic Stroke Patients (22).	A randomized controlled trial with two groups (n=60; 30 intervention, 30 control)	Facial expression exercise using mirror media vs. without mirror	5 weeks	The intervention group showed greater improvement in facial muscle strength (mean diff 19.4; p=0.000). N-Gain score 56.31% → intervention with mirrors was more effective.
The effects of Oral Motor Facilitation Technique (OMFT) on oral motor function in stroke patients (23).	Randomized controlled trial; 72 stroke patients with dysphagia (36 intervention, 36 control)	OMFT (Oral Motor Facilitation Technique) vs conventional swallowing rehabilitation therapy	30 minutes/day, 5×/week for 4 weeks (20 sessions)	Both groups improved, but the OMFT group showed significant improvement in jaw, lip, cheek, and tongue movements. Significant improvement in eating/drinking (solid & liquid swallowing), voice, and overall oromotor function (p<0.05).
Comparison of 2 types of therapeutic exercise: jaw opening exercise and head lift exercise for dysphagic stroke: A pilot study (24).	Pilot study, 30 stroke patients with dysphagia	aw Opening Exercise (JOE) using resistance bar vs Head Lift Exercise (HLE)	6 weeks	Both interventions increased suprahyoid muscle thickness & hyoid movement (anterior & superior). JOE had a lower exertion level
Effects of resistive jaw opening exercise in stroke patients with dysphagia: A	Double-blind RCT, 40 stroke	Resistive Jaw Opening Exercise (RJOE) using a portable	4 weeks, 5 times/week	RJOE increased hyoid movement, decreased aspiration scores (PAS), and

double-blind, randomized controlled study (25).	patients with dysphagia	device vs. a sham device		increased oral intake (FOIS). It was particularly effective for liquid-type PAS.
Pengaruh Oral Motor Exercise Terhadap Kejadian Aspirasi Pada Pasien Stroke (26).	Quantitative, Quasi-experimental, pretest–posttest with control group, n=34	Oral Motor Exercise	Duration unknown (not specified)	Oral motor exercise has a significant effect in reducing the incidence of aspiration in stroke patients in the stroke unit at Dr. M. Yunus Bengkulu Regional General Hospital.

DISCUSSION

A review of twelve articles analyzed in this literature review shows that facial expression exercises, oral motor exercises, and various other forms of orofacial exercises contribute significantly to improving communication skills in stroke patients (26). In most studies, exercises that stimulate the facial muscles, lips, tongue, and jaw have been shown to increase muscle strength, improve articulation, and maximize oromotor function, which ultimately supports improved verbal and nonverbal communication skills. These findings are consistent with the fact that stroke often causes facial muscle weakness, dysarthria, articulation disorders, decreased lip control, and drooling due to damage to the cranial nerves and motor cortex areas involved in speech mechanisms (25).

Several studies emphasize that oromotor intervention has a direct impact on articulation and voice production. Suyanto(15) showed that regular lip and blowing pipe exercises over two weeks can improve breathing control and clarity of pronunciation, thereby helping patients to convey words and sentences more accurately. These findings are reinforced by a study by Madathodiyil (17), which explains that structured tongue and lip movements result in increased speech intelligibility and a decrease in the Formant Centralization Ratio, an important indicator of articulation improvement in patients with dysarthria. Vocal-based interventions such as “AIUEO” therapy and Melodic Intonation Therapy (MIT) have also been proven effective in improving the language abilities of stroke patients, as reported by Machmudah (18). The combination of vocal and intonation methods even provides more optimal results in improving expressive abilities.

Technology-based interventions are also one of the promising modern approaches in post-stroke rehabilitation. A study by Kim (20) found that smartphone-based speech therapy applications can improve articulation clarity, consonant accuracy, and reduce the severity of dysarthria within four weeks. The use of this technology is also considered practical and increases patient motivation to practice independently, making it an effective solution in conditions where access to rehabilitation services is limited.

In addition to affecting verbal aspects, facial expression exercises also have a significant impact on facial muscle strength and nonverbal communication skills. Martono (22) showed that facial expression exercises using mirrors enabled patients to improve facial movement symmetry through visual feedback. This exercise significantly increases facial muscle strength compared to exercises without mirrors, thereby helping patients display clearer and more proportional emotional expressions (14).

Communication disorders in stroke patients are also often associated with swallowing disorders (dysphagia) due to impaired oropharyngeal muscle coordination. Oromotor exercises have been shown to help overcome dysphagia by increasing the strength and coordination of the jaw, tongue, and lip muscles. Young-Su et al. (2023) showed that Oral Motor Facilitation Techniques (OMFT) not only improve swallowing function but also enhance voice quality and speech ability. Research by Choi and Park (24,25) supports this by showing that jaw opening and resistive jaw opening exercises can improve

hyoid movement and reduce the risk of aspiration. The clinical implications are clear: the better the swallowing function, the more stable the voice production and articulation, resulting in more effective communication. These findings are reinforced by the study by Anjelina (26), which confirms that oromotor exercises can reduce the incidence of aspiration, a complication that often hinders speech ability in stroke patients.

In general, the results of all articles show a consistent pattern that orofacial exercises, both facial expression and oral motor, are effective in improving communication function in stroke patients. Interventions that are carried out regularly, intensively, and structurally can improve neuromuscular function and support brain neuroplasticity in speech recovery (3). Variations in approaches, ranging from manual exercises, mirror use, vocal therapy, to digital technology, provide flexibility that can be tailored to the conditions and limitations of each patient (27).

Implication

The findings suggest that facial expression and oral motor exercises can be feasibly integrated into routine stroke rehabilitation to support communication recovery, including in resource-limited settings. These interventions are simple, low-cost, and can be delivered as part of multidisciplinary care, including nursing-led support. Technology-based approaches also show potential to enhance patient engagement and extend rehabilitation into home settings. However, given the variability in study designs and outcomes, further high-quality research is needed to establish standardized protocols, optimal intervention intensity, and long-term effectiveness. Strengthening the evidence base will be essential for informing clinical guidelines and broader implementation in stroke rehabilitation programs.

Limitation

However, some studies have limitations such as small sample sizes, inconsistent intervention durations, and varying communication assessment instruments, so the generalization of results must be done carefully. Overall, the empirical evidence found supports that facial expression and oral motor exercises are safe, inexpensive, and effective interventions for improving communication skills in stroke patients, both in verbal and nonverbal aspects.

CONCLUSION

Based on the results of a review of twelve articles analyzed, it can be concluded that facial expression exercises and oral motor exercises are effective interventions in improving communication skills in stroke patients. Both exercises have been proven to improve facial muscle strength, increase control of lip and tongue movements, improve articulation, and support stable voice production. In addition, oromotor exercises also have a positive impact on swallowing function, which indirectly contributes to the quality of verbal communication. Technology-based interventions, such as speech therapy applications, also show promising results in improving speech intelligibility and motivation for independent exercise. Overall, structured, routine, and multimodal orofacial exercises have been shown to support the communication rehabilitation process in stroke patients through neuromuscular enhancement and neuroplasticity stimulation. Despite some limitations, such as variations in study design, small sample sizes, and the use of different measurement instruments, the findings in this literature provide a strong scientific basis for recommending facial expression and oral motor exercises as part of the standard rehabilitation program for stroke patients.

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Author Contributions

V.A.P. conceptualized the study, conducted the literature search, screened articles, extracted data, and drafted the manuscript. F.N.R. supervised the study, contributed to methodological refinement, reviewed the analysis, and critically revised the manuscript. Both authors approved the final version of the manuscript.

Conflict of Interest

The author has no conflicts of interest.

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