Indonesian Journal of Global Health Research
Volume 7 Number 2, April 2025
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

LITERATURE RIVEW: EFFECTIVENESS OF SPEECH THERAPY IN IMPROVING VERBAL COMMUNICATION ABILITY OF STROKE PATIENTS WITH DYSARTHRIA

Eko Kurniawan*, Suyanto, Erna Melastuti, Dwi Retno Sulistyaningsih
Universitas Islam Sultan Agung Semarang, Jl. Kaligawe Raya No.Km.4, Terboyo Kulon, Genuk, Semarang, Central Java 50112 Indonesia
*ekokurniawann789@gmail.com

ABSTRACT
Stroke often results in speech impairment, including dysarthria, which impacts the patient's verbal communication skills, quality of life, social interaction and independence. Therefore, understanding the effectiveness of speech therapy in improving verbal communication skills is necessary to determine the most effective rehabilitation approach. Objective: This study aims to explore the effectiveness of speech therapy in improving verbal communication of stroke patients with dysarthria, particularly in the aspects of articulation, voice clarity, and the ability to speak in daily life. Method: Methods: This study used a literature review of national and international published between 2019-2024 and freely available. A systematic search of the review was conducted using the Google Scholar database, Semantic Scholar, using keywords: Dysarthria Speech Therapy, Stroke, using the PCC (Population, Concept, Context) approach. The article selection process used PRISMA which was then subjected to critical appraisal. Initial searches were conducted through Google Scholar (1,215 articles), Semantic Scholar (485 articles). Initial screening of 1,450, removal of duplicate articles remaining 250 articles, articles were eliminated, so only 15 articles entered the further screening stage. From this process, 5 articles did not meet the criteria and were excluded. Finally, 10 articles that met the inclusion criteria were selected and reviewed.. Result: The results of thousands of articles show ten articles showing consistent results that speech therapy can improve verbal communication skills in patients with diarthric stroke. Conclusion: There is general agreement that speech therapy is effective in improving verbal communication skills in stroke patients with dysarthria.

Keywords: dysarthria; speech therapy; stroke

How to cite (in APA style)
Kurniawan, E., Suyanto, S., Melastuti, E., & Sulistyaningsih, D. R. (2025). Literature Rivew: Effectiveness of Speech Therapy in Improving Verbal Communication Ability of Stroke Patients with Dysarthria". Indonesian Journal of Global Health Research, 7(2), 701-708. https://doi.org/10.37287/ijghr.v7i2.5604.

INTRODUCTION

Stroke, a medical condition resulting from impaired blood flow to the brain, is a significant global health problem. Every year, millions of individuals around the world experience a stroke, often with serious long-term consequences, including neurological disorders such as dysarthria (Srinivasan & Narayanan, 2025). Epidemiologic studies show that a sizable percentage of stroke survivors experience difficulty in communicating due to damage to the areas of the brain that control language and speech production (Riyanta et al., 2023).The global burden of stroke is of increasing concern. The disease not only causes death in millions of people every year, but is also a leading cause of disability in the world. Stroke often results in dysarthria, a condition characterized by complex speech disorders, characterized by abnormalities of the neurological cedar, is a complex speech disorder characterized by abnormalities in various aspects of sound production, such as strength, speed and coordination of speech muscles, which ultimately impacts the clarity and naturalness of speech and causes challenges in daily communication and reduces quality of life (Portalete et al., 2019).

Dysarthria is a speech disorder affecting the control and execution of motor speech that results from neurological injury to the motor components of the speech area and affects 38-41% of the stroke population. Dysarthria, or speech impairment due to nervous system damage, not only impacts a person's ability to speak, but can also cause serious psychological problems. People with dysarthria may feel their self-identity is threatened, struggle with social relationships, experience emotional disturbances such as depression or anxiety, and even feel undervalued by others. While we know a lot about the emotional and social impact of dysarthria, there has not been much in-depth research into the economic impact of this disorder (Arnold et al., 2021).Dysarthria, as a motor speech disorder, requires a comprehensive rehabilitation approach. Effective interventions involve a combination of strategies such as neurorehabilitation to restore nerve function, behavioral exercises to improve speech muscle control, and social support to improve quality of life (Kim et al., 2024). Behavioral speech exercises, for example, focus on strengthening the respiratory and oral muscles, as well as modifying speech patterns such as slowing down the speed of speech or controlling intonation to improve clarity and fluency of communication. An individually tailored treatment plan, considering the patient's initial communication ability, stage of recovery, and goals to be achieved, is key to successful rehabilitation of dysarthria (Kim et al., 2024).

Speech therapy is a key modality in dysarthria rehabilitation. Structured exercises, such as oral motor and articulation exercises, aim to improve muscle strength, coordination and flexibility of the speech organs (Karim, 2024). However, the success of therapy is greatly influenced by factors such as the severity of dysarthria, patient motivation, and availability of resources. In addition, the effectiveness of speech therapy is often limited to symptom improvement, while the underlying brain damage remains (Wong et al., 2022). This study aims to measure the extent to which speech therapy can provide improvements in the verbal communication skills of stroke patients who experience dysarthria.

METHOD

The method used is a literature review with identification in the search strategy. Literature review is used in searching for articles on speech therapy research on dysarthria, using keywords. The keyword used in this research is “speech therapy on dysarthria” the literature data in this study comes from scientific articles published in the last 5 years (2019-2024) and obtained through the semantic scholar search engine. A systematic search of reviews was carried out using the Google Scholar database, Semantic Scholar, using keywords: Dysarthria Speech Therapy, Stroke, with the PCC (Population, Concept, Context) approach. The article selection process uses PRISMA which is then subjected to critical appraisal. The initial search was conducted through Google Scholar (1,215 articles), Semantic Scholar (485 articles). Initial screening of 1,450, removal of duplicate articles remaining 250 articles, articles were eliminated, so only 15 articles entered the further screening stage. From this process, 5 articles did not meet the criteria and were excluded. Finally, 10 articles that met the inclusion criteria were selected and reviewed.

Tabel 1

Kata kunci penelitian pada PCC

PCC	*Keyword*
P	Stroke
C	Dysarthria
C	Speech Therapy

Database yang digunakan: Google Scholar, Semantic Scholar. Kata kuncu: Dysarthria Speech Therapy, Stroke.

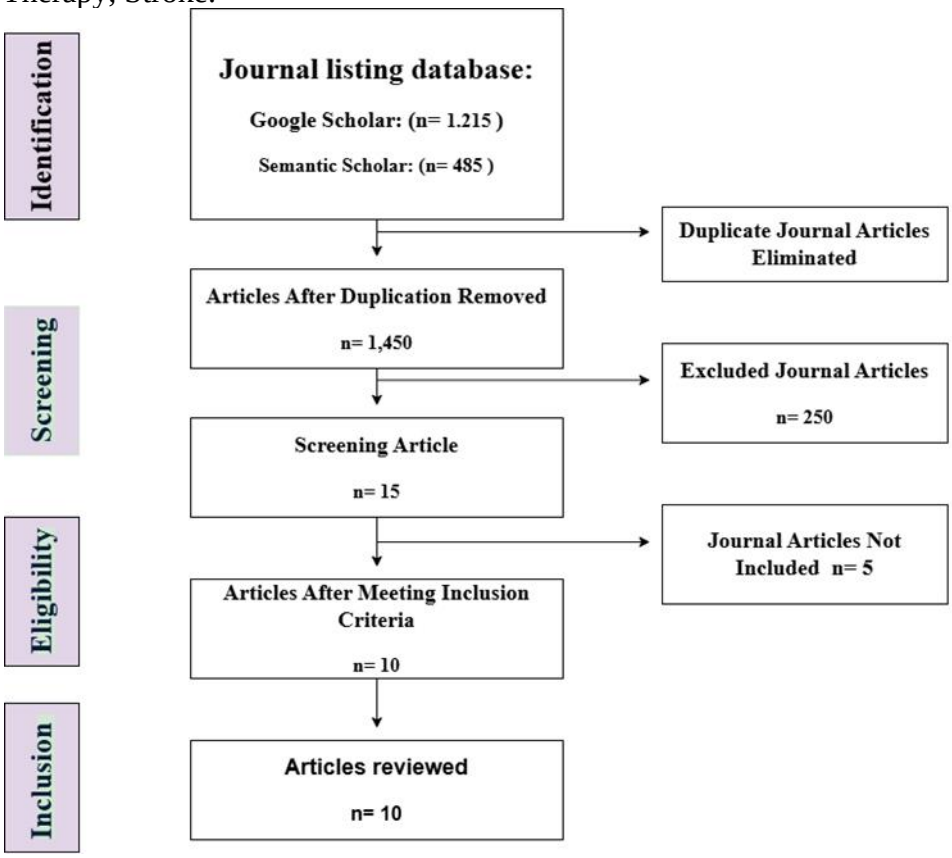

Figure 1. Flow chart

RESULT

The results of this article search using the PRISMA approach show the flow of article selection in a literature insight or meta-analysis. The process starts with the identification of articles from two databases, namely Google Scholar (1,215 articles) and Semantic Scholar (485 articles). After removing duplicates, 1,450 articles remained for the next stage. At the screening stage, 250 articles were cut because they did not meet the criteria set. Furthermore, 15 articles underwent a further selection process at the eligibility stage, where 5 articles were excluded because they did not meet the inclusion criteria. At the final stage, 10 articles met the inclusion criteria and were reviewed in this study. The article selection process was conducted systematically to ensure only relevant and quality articles were used in the study.

Table 2.
Article Search Results

Journal	Title/author/year	Place of research (country)	Method (sample)	Research objectives
1	Effect of conventional speech therapy with liuzijue qigong, a traditional Chinese method of breath training in 70 patients with post-stroke spatic dysarthria (Xia et al., 2023)	China	quasi-experimental design randomly divided (70 patients with PSSD)	This study aims to compare the effects of conventional speech therapy and conventional speech therapy combined with LQG in patients with PSSD.
2	Efficacy And Feasibility of A Digital Speech Therapy For Post-Stroke Dysarthria:	South Korea	randomized controlled trial/RCT (76	This study aims to investigate the efficacy and feasibility of digital speech therapy applications in

Journal	Title/author/year	Place of research (country)	Method (sample)	Research objectives
	Protocol For A Randomized Controlled Trial (Kim et al., 2024)		participants with post-stroke dysarthria))	addressing gaps in the treatment of disa
3	The combination of accent method and phonemic contrast: an innovative strategy to improve speech production in post-stroke dysarthria (Ge et al., 2023)	China	quasi-experimental (total number 15, 12 males	This study aims to explore the feasibility and direct effectiveness of a particular rhythm pattern combination of accent and phonemic contrast methods on speech production.
4	Guideline adherence in speech and language therapy in stroke aftercare. A health insurance claims data analysis (Schindel et al., 2022)	United States	method of analysis Systematic study. observational analytic	This study was designed to investigate the knowledge awareness and practice of oral motor training among speech and language pathologists in various disorders.
5	Development of speech command control based tinyMl system for post-stroke dysarthria therapy device (Riyanta et al., 2023)	Indonesia	Multi control design	This research aims to develop a portable wireless multi controller with simulated dysarthric vocal speech in Bahasa Indonesia and non-dysarthric micro speech recognition, using a small machine learning system (TinyMl) for hardware efficiency.
6	The effect of combination respiratory muscle training (CRMT) on dysarthric speech following a single CVA: a retrospective pilot study (Arnold et al., 2021)	USA	Experimental	The aim of this study was to assess the effectiveness of a combined CRMT protocol in improving speech in stroke patients with dysarthria.
7	Inappropriate pause detection in dysarthric speech using large-scale speech recognition (Lee et al., 2024)	South Korea	Evaluation matrix method	The aim of this research is to develop an accurate method for detecting appropriate pauses in the speech of people with dysarthria and to design an effective language speech therapy.
8	Motor speech treatment inflaccid dysarthria: a case report (Portalete et al., 2019)	brasil	Case study	The aim of this study was to evaluate the effectiveness of speech-language therapy in patients with flaccid dysarthria due to stroke, especially When therapy is initiated several years after the occurrence of stroke
9	Assessment of non-progressive dysarthria: practice in lebanon (Summaka et al., 2021)	Lebanon	Document analysis, observation and survey	aims to explore the assessment practices and attitudes of Lebanese SLTs working with adults with non-progressive dysarthria and to investigate their adherence to the World Health Organization's International Classification of Functioning, Disability, and Health (ICF) framework.
10	Transcranial direct current stimulation over the primary motor cortex improves speech production in post-stroke dysarthric speakers: A randomized pilot study (Wong et al., 2022)	Hong kong	Randomized controlled trial The current study investigated the potential of transcranial	This study aimed to investigate the potential of transcranial direct current stimulation (TDCS) therapy on speech intelligibility physiological and vocal speech-related functions among post-stroke dysarthria patients.

Journal	Title/author/year	Place of research (country)	Method (sample)	Research objectives
			direct current stimulation (tDCS) therapy on speech intelligibility, speech-related physiological and vocal functions among post-stroke dysarthria patients	

DISCUSSION

This literature review is to assess the effectiveness of speech therapy in improving the verbal communication skills of stroke patients with dysarthria The results of 10 studies from 8 countries with various research designs, including 2 studies with observation, 1 study with case studies, 1 study with the evaluation matrix method, 3 studies with quasy experiments and 2 studies with RCT 1 study with a multi-control design showed that speech therapy had a significant effect on improving the verbal communication of stroke patients with dysarthria. (Xia et al., 2023; (Ferguson & Hartigan, 2023) in this study obtained the results of respondents 70 patients with PSSD randomly divided into control groups. the results of the study after a 4-week intervention in two groups, namely the control group and the experimental group. The results showed a significant increase (statistically different) in several variables measured, both in the control group and the experimental group. (Kim et al., 2024; Septiasih et al., 2023) in their research obtained the results of 76 participants with post-stroke dysarthria. The results of this study have significant implications for clinical practice. Digital speech therapy can be an attractive alternative to traditional therapy, especially for patients who have difficulty accessing rehabilitation services regularly. However, it is important to remember that digital speech therapy is not a total replacement for face-to-face therapy with a speech therapist. Digital therapy can complement traditional therapy and provide additional support for patients. (Ge et al., 2023) in their study obtained the results of respondents of 15 post-stroke dysarthria patients (12 men and 3 women). The results of this study showed that the number of correct target syllables sentence clarity and intensity standard deviation increased significantly in andante (medium) compared to other rhythms. The number of correct target syllables sentence clarity, sentence intelligibility and intensity standard deviation increased significantly compared to non-phonemic contrast at andante (medium).

Schindel et al (2022) in their study 4,486 stroke patients diagnosed with certain disorders or receiving speech therapy were included in the study. The average age was 78 years; the proportion of women was 55.9%. Within the first year after stroke, 90.3% of patients were diagnosed with speech disorders and swallowing disorders. Overall, 44.1% of patients received outpatient speech and language therapy post-treatment. Women were less often diagnosed with a specific disorder (OR 0.70 [95%CI: 0.55/0.88], p = 0.003) and less often received longer therapy sessions (OR 0.64 [95%CI: 0.43/0.94], p = 0.022). Older age and longer duration of hospitalization increase the likelihood of guideline recommendations being implemented and earlier post-stroke care measures. (Ryanta et al., 2023) The results showed that the system was able to achieve high accuracy in speech recognition, even in noisy conditions. However, the study also identified some challenges, such as overfitting issues on small datasets and the need to improve data quality. (Arnold et al., 2022) in their study of 10

speech therapy patients. The results of this study after 28 days of CMRT the intervention group showed significant improvement compared to the control group in peak expiratory flow (PEF) (IG: 73.12% vs. CG: 4.66%), Self Perception of Intelligence (IG: 72.38% vs. CG: 0.83%), and the word task of the Dysarthria Speech Intelligence Assessment (AIDS) (IG: 43.92% vs. CG: 0%). Lee et al 2024) in their research have successfully developed a new method for pause detection in dysarthric speech. By treating pauses as tokens and extending the ASR model, this study has achieved higher accuracy and better consistency in detecting pauses. The results of this study have great potential to improve the diagnosis and rehabilitation of patients with dysarthria.

(Portalete et al., (2019) in their study used 1 subject, a 45-year-old man who had phakic dysarthria due to stroke. The results of this study indicate that timely and intensive speech-language therapy can provide significant improvements in dysarthria symptoms even in patients who had a stroke several years earlier. (Summaka et al., 2021) data were collected through an online survey that included information on the socio-demographic characteristics of the practices and attitudes of SLTs who assessed adults with non-progressive dysarthria. As a result of this study, 50 Lebanese SLTs responded to the survey. The majority of SLTs (78%) assessed clients with non-progressive dysarthria across the ICF domains. SLTs reported dissatisfaction with available assessment tools (64%) and reliance on informal tools (84%). In addition, 68% of SLTs suggested the need for the development of a formal Arabic assessment.Speech therapy has a significant impact on improving the communication skills of patients with dysarthria (Gison et al., 2025; Sukmawati et al., 2024). Speech therapy interventions that include articulation exercises, breathing control, and compensatory strategies have been shown to improve voice intelligibility and interlocutor comprehension (Mendoza Ramos et al., 2021). In addition, ongoing therapy with an individualized approach, where techniques are tailored to the severity and needs of the patient, provides more effective results. Other factors that support successful therapy include patient motivation, family support, and multidisciplinary team involvement in treatment (Ge et al., 2024).

Factors that support the success of speech therapy include several important aspects, including the consistency and intensity of therapy, the involvement of competent experts, and social support from family and the surrounding environment (Piekacz et al., 2020; (Amila et al., 2019). Patient motivation is also a key element in determining the effectiveness of therapy, where patients who have strong determination and attend therapy sessions regularly tend to experience more significant improvements (Toles et al., 2024). In addition, the use of technology in therapy, such as speech-assistive devices and interactive apps, can accelerate the recovery process (Fegter et al., 2024). However, there are obstacles that can affect the success of speech therapy, such as limited access to rehabilitation services, lack of experts in certain areas, and patients' financial limitations in undergoing long-term therapy (Mwende & Abuom, 2024). Psychological factors, such as anxiety and lack of motivation, can also hinder patients' progress during the therapy process (O'Connor & Pettigrew, 2009; (Nur Annisa et al., 2024). Therefore, a holistic approach that includes medical, social, and psychological aspects is necessary to achieve optimal outcomes.

CONCLUSION

Based on the 10 studies reviewed, there is strong agreement that speech therapy has a significant effect in improving verbal communication skills in stroke patients with dysarthria. Despite heterogeneity in research design and sample population, all studies consistently showed significant improvement.

REFERENCES

Amila, A., Sembiring, E., & Sinaga, J. (2019). Pemberdayaan Keluarga Pasien Stroke Afasia Melalui Pelatihan Komunikasi Verbal. Jurnal Abdimas BSI: Jurnal Pengabdian Kepada Masyarakat, 2(2), 396–403. https://doi.org/10.31294/jabdimas.v2i2.6120

Ferguson, E., & Hartigan, S. (2023). Speech and Language Therapy. In Care of Head and Neck Cancer Patients for Dental Hygienists and Dental Therapists (pp. 85–90). Wiley. https://doi.org/10.1002/9781119795032.ch14

Karim, S. (2024). Exploring the Efficacy of Neuroplasticity-Driven Speech Therapy for Post-Stroke Aphasia Recovery: A Multimodal Intervention Approach. https://doi.org/10.14293/PR2199.000781.v1

Kim, Y., Kim, M., Kim, J., & Song, T.-J. (2024). Smartphone-Based Speech Therapy for Poststroke Dysarthria: Pilot Randomized Controlled Trial Evaluating Efficacy and Feasibility. Journal of Medical Internet Research, 26, e56417. https://doi.org/10.2196/56417

Nur Annisa, I., Rondhianto, Nistiandani, A., & Shodikin, M. (2024). Effect of AIUEO Vocal Therapy in Non-Hemorrhagic Stroke Patients with Verbal Communication Disorders: A Case Report. Health and Technology Journal (HTechJ), 2(5), 463–469. https://doi.org/10.53713/htechj.v2i5.230

Septiasih, W., Mariani, M., & Marfuah, M. (2023). Terapi Wicara Berpengaruh terhadap Kemampuan Komunikasi Verbal Pasien Pasca Stroke dengan Afasia. Wiraraja Medika : Jurnal Kesehatan, 13(2), 1–6. https://doi.org/10.24929/fik.v13i2.2611

Srinivasan, S., & Narayanan, S. (2025). Impact of 'Be Clear' Treatment on Speech and Functional Communication Outcomes in Adults with Post-Stroke Dysarthria. International Journal of Health Sciences and Research, 15(1), 38–47. https://doi.org/10.52403/ijhsr.20250106

Sukmawati, S., Mamuroh, L., & Nurhakim, F. (2024). Peningkatan Kualitas Hidup Pasien Stroke melalui Edukasi Terapi Wicara dan Stroke Home Care. GUYUB: Journal of Community Engagement, 5(2), 466–479. https://doi.org/10.33650/guyub.v5i2.8501

Fegter, O., Rademaker, A., Bona, M., Roberts, A., & Rogalski, E. (2024). App Engagement In Technology-Supported Speech-Language Therapy For Primary Progressive Aphasia. Innovation in Aging, 8(Supplement_1), 1373–1373. https://doi.org/10.1093/geroni/igae098.4376

Ge, S., Wan, Q., Wang, Y., Yin, M., & Huang, Z. (2024). The combination of accent method and phonemic contrast: an innovative strategy to improve speech production on post-stroke dysarthria. Frontiers in Human Neuroscience, 17. https://doi.org/10.3389/fnhum.2023.1298974

Gison, A., Ruggiero, M., Tufarelli, D., Proietti, S., Moscariello, D., & Valente, M. (2025). Intensive Speech Therapy for Hypokinetic Dysarthria in Parkinson's Disease: Targeting the Five Subsystems of Speech Production with Clinical and Instrumental Evaluation. NeuroSci, 6(1), 7. https://doi.org/10.3390/neurosci6010007

Mendoza Ramos, V., Paulyn, C., Van den Steen, L., Hernandez-Diaz Huici, M. E., De Bodt, M., & Van Nuffelen, G. (2021). Effect of boost articulation therapy (BArT) on intelligibility in adults with dysarthria. International Journal of Language & Communication Disorders, 56(2), 271–282. https://doi.org/10.1111/1460-6984.12595

Mwende, M. C., & Abuom, T. (2024). Exploring Therapy-Related Constraints In The Delivery Of Speech And Language Therapy Services To Children With Cerebral Palsy In Kibera Slums, Nairobi City County, Kenya. European Journal of Special Education Research, 10(4). https://doi.org/10.46827/ejse.v10i4.5391

O'Connor, S., & Pettigrew, C. M. (2009). The barriers perceived to prevent the successful implementation of evidence-based practice by speech and language therapists.

International Journal of Language & Communication Disorders, 44(6), 1018–1035. https://doi.org/10.1080/13682820802585967

Piekacz, P., Węsierska, K., & Węsierska, M. (2020). Uwarunkowania skuteczności terapii utrwalonego jąkania w opiniach logopedów i studentów logopedii. Logopaedica Lodziensia, 4, 187–204. https://doi.org/10.18778/2544-7238.04.13

Toles, L. E., Turner, M., & Harris, A. L. (2024). Patient Motivation for Voice Therapy Increases After Stimulability Testing: Validation of a Voice Therapy Motivation and Voice Perception Inventory. American Journal of Speech-Language Pathology, 33(6), 2823–2838. https://doi.org/10.1044/2024_AJSLP-24-00058

Arnold, R. J., Bausek, N., Gaskill, C. S., & Midani, T. (2021). The Effect of Combined Respiratory Muscle Training (cRMT) on dysarthric speech following single CVA: A retrospective pilot study. MedRxiv, 0–16. https://www.embase.com/search/results?subaction=viewrecord&id=L2012993679&from=export%0Ahttp://dx.doi.org/10.1101/2021.05.01.21256463

Ge, S., Wan, Q., Wang, Y., Yin, M., & Huang, Z. (2023). The combination of accent method and phonemic contrast: an innovative strategy to improve speech production on post-stroke dysarthria. Frontiers in Human Neuroscience, 17(January), 1–11. https://doi.org/10.3389/fnhum.2023.1298974

Kim, Y., Kim, M., Kim, J., & Song, T. J. (2024). Efficacy and feasibility of a digital speech therapy for post-stroke dysarthria: protocol for a randomized controlled trial. Frontiers in Neurology, 15(January), 1–10. https://doi.org/10.3389/fneur.2024.1305297

Lee, J., Choi, Y., Song, T. J., & Koo, M. W. (2024). Inappropriate Pause Detection in Dysarthric Speech Using Large-Scale Speech Recognition. ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 12486–12490. https://doi.org/10.1109/ICASSP48485.2024.10447681

Portalete, C. R., Agustín, G., Urrutia, U., & Pagliarin, K. C. (2019). Motor speech treatment in flaccid dysarthria : a case report Tratamento motor da fala na disartria flácida : um estudo de caso. 1–9.

Riyanta, B., Irianta, H. A., & Kamiel, B. P. (2023). Development of Speech Command Control Based TinyML System for Post-Stroke Dysarthria Therapy Device. Journal of Robotics and Control (JRC), 4(4), 466–478. https://doi.org/10.18196/jrc.v4i4.15918

Schindel, D., Mandl, L., Schilling, R., Meisel, A., & Schenk, L. (2022). Guideline adherence in speech and language therapy in stroke aftercare. A health insurance claims data analysis. PLoS ONE, 17(2 February), 1–19. https://doi.org/10.1371/journal.pone.0263397

Summaka, M., Harati, H., Hannoun, S., Zein, H., Koubaisy, N., Fares, Y., & Nasser, Z. (2021). Assessment of non-progressive dysarthria: practice and attitude of speech and language therapists in Lebanon. BMC Neurology, 21(1), 1–11. https://doi.org/10.1186/s12883-021-02484-2

Wong, M. N., Baig, F. N., Chan, Y. K., Ng, M. L., Zhu, F. F., & Kwan, J. S. K. (2022). Transcranial direct current stimulation over the primary motor cortex improves speech production in post-stroke dysarthric speakers: A randomized pilot study. PLoS ONE, 17(10 October), 1–23. https://doi.org/10.1371/journal.pone.0275779

Xia, J., Pei, S., Chen, Z., Wang, L., Hu, J., & Wang, J. (2023). Effects of Conventional Speech Therapy with Liuzijue Qigong, a Traditional Chinese Method of Breath Training, in 70 Patients with Post-Stroke Spastic Dysarthria. Medical Science Monitor, 29, 1–10. https://doi.org/10.12659/MSM.939623.