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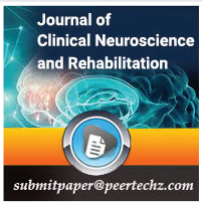

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Research Article

Development of Eclectic Dysphagia Management Program for Management of Neurogenic Oropharyngeal Dysphagia (NOD): A Preliminary Study

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Abstract

Aim: The Eclectic Dysphagia Management Program (EDMP) is a structured framework integrating multiple therapeutic strategies to manage neurogenic oropharyngeal dysphagia (NOD). This study evaluates its effectiveness through a pilot and main study, focusing on assessment refinement and individualized therapy application.

Methods: The EDMP was developed through a systematic literature review (PRISMA), expert consensus, and a pilot study with five participants (mean age 59.9 ± 1.79 years). The main study included 145 participants (mean age: 61.98 ± 4.20 years) diagnosed with NOD via Fiberoptic Endoscopic Evaluation of Swallowing (FEES), Mann Assessment of Swallowing Ability (MASA), and Dysphagia Handicap Index (DHI). Therapy sessions were structured into four phases, incorporating compensatory, rehabilitative, and NMES-assisted strategies. Statistical analysis included the Wilcoxon Signed-Rank Test and effect size calculations.

Results: Significant post-therapy improvements were observed in PAS (pre: 4 ± 1.12; post: 1 ± 0.74, $p < 0.001$), MASA (pre: 141.80 ± 10.16; post: 175.40 ± 5.00, $p < 0.001$), and DHI (pre: 63.47 ± 4.36; post: 16.07 ± 4.56, $p < 0.001$). Therapy duration peaked in the 12th session (63.27 ± 0.77 minutes). Effect sizes for MASA (0.88), PAS (0.90), and DHI (0.88) confirmed a strong therapeutic impact.

Conclusion: The EDMP offers a standardized, yet flexible, dysphagia management approach, effectively improving swallowing function, safety, and quality of life. Future studies should validate findings through larger, multi-site randomized controlled trials (RCTs).

Introduction

Dysphagia, a condition characterized by difficulties or dysfunction in the swallowing process, can manifest due to a wide range of factors impacting its four stages of swallowing, namely oral preparatory, oral transit, pharyngeal, and esophageal [1]. Dysphagia's underlying causes span neurological disorders, head and neck cancers, muscular conditions, iatrogenic factors, and diseases affecting the central nervous system, cranial nerves, neuromuscular junction, and muscles [2,3]. Given the complexity and variability of dysphagia, treatment approaches must be adaptable and tailored to individual patient needs. Conventional dysphagia therapies often focus on a single approach, which may not fully address the range of impairments experienced by individuals with neurogenic oropharyngeal dysphagia (NOD). As a result, there is a need for an approach that integrates multiple therapeutic strategies to ensure a more comprehensive management plan.

Eclectic therapy: A flexible approach to dysphagia management

One such approach is eclectic therapy, which has gained attention in dysphagia management due to its ability to combine various evidence-based interventions within a single framework [4]. Rather than adhering to a rigid treatment protocol, eclectic therapy allows for flexibility in selecting and modifying treatment strategies based on individual patient needs. Eclectic therapy, which is sometimes referred to as multi-modal or integrative therapy, is an approach that draws on multiple theoretical orientations and techniques in one framework for management [4]. It is a versatile and comprehensive approach to therapy that enables the therapist

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to use the best strategies to meet the needs of each patient. In layman's terms, an eclectic approach is defined as a flexible and adaptable approach that brings multiple techniques of therapy, which treat different pathologies under one roof, so that the therapist can choose the techniques that suit the patient's specific and unique needs. In Eclectic Therapy, skilled therapists tailor the therapy program that is best for the client and their difficulties rather than adhering to a single theory as a one-size-fits-all approach [5]. To work on strengthening and facilitating patients' specific needs, this approach involves using whichever technique might work best for that impairment and their circumstances, or a mixture of many techniques [4]. Although this approach can be confusing for both clinician and patient, as in this approach, therapists must move quickly from one type of therapy to another, it has many benefits [6]. This approach integrates compensatory techniques, rehabilitative exercises, sensory stimulation, and neuromuscular electrical stimulation (NMES) to address the diverse physiological impairments associated with dysphagia [5]. The adaptability of eclectic therapy is particularly relevant for NOD, where patients present with varying degrees of impairment requiring a tailored intervention plan.

Prevalence

It is a highly prevalent disorder and increasingly common with increasing age. Among the elderly population, dysphagia is particularly prevalent, contributing to significant health risks such as malnutrition, dehydration, and infections [3]. More than 13% of the entire population are 65years or older, and dysphagia affects 51% of elderly residents of institutions. Dysphagia also affects 16% of those living independently in the age range of 70 to 79 and 33% of people over the age of 80, with an even higher prevalence among elderly hospital patients [7]. According to radiologic swallow examinations, up to 63% of elderly individuals who did not complain of dysphagia in the research showed impaired swallow function. In comparison to acute stroke patients who had ischemic strokes, who were 46% less likely to be at risk of post-stroke dysphagia (PSD), haemorrhagic stroke patients had a 1.52 times higher risk of PSD [8,9].

Neurogenic oropharyngeal dysphagia (NOD)

Oropharyngeal dysphagia is the term for physiological swallowing impairments that affect bolus passage through the upper aerodigestive tract and airway protection [10]. The clinical symptom of oropharyngeal dysphagia is the inability to convey the alimentary bolus from the mouth to the esophagus because of an issue with oral preparation, oral transport, and/or pharyngeal swallowing [2]. Oropharyngeal dysphagia is most frequently associated with long-term neurologic diseases, such as Parkinson's disease, stroke, and dementia [8]. It might be the initial sign of a neuromuscular condition like myasthenia gravis or amyotrophic lateral sclerosis [8]. Oropharyngeal dysphagia occurring from neurological origin is operationally referred to *as Neurogenic Oropharyngeal Dysphagia* (NOD).

Assessment of Neurological Oropharyngeal Dysphagia (NOD)

The assessment of NOD aims to identify swallowing abnormalities, their impact on daily activities, and potential facilitators or barriers to safe swallowing. Screening identifies at-risk patients, while comprehensive assessment provides a deeper understanding of swallowing physiology [11]. Standardized evaluation tools include bedside clinical swallowing assessment, videofluoroscopy (VFS), and fiberoptic endoscopic evaluation of swallowing (FEES). Self-reported measures assessing the impact of dysphagia on quality of life, as well as supplementary assessments such as esophagography and electromyography, further refine diagnosis.

Management of Neurological Oropharyngeal Dysphagia (NOD)

The management of NOD necessitates a collaborative approach involving a diverse team of professionals, including speech pathologists, neurologists, gastroenterologists, and others. Treatment strategies range from direct swallowing exercises and compensatory postural adjustments to diet modifications and NMES-based interventions [2,12,13]. Research suggests that multimodal interventions that integrate both rehabilitative and compensatory techniques lead to better patient outcomes compared to a singular treatment modality [5].

The need for EDMP: Advancing dysphagia therapy

Despite the availability of conventional therapies, a significant gap exists in providing a structured yet adaptable program that accommodates the complexities of dysphagia management. The McNeill Dysphagia Therapy Program (MDTP) is one of the few structured dysphagia rehabilitation models, but it is primarily exercise-based and does not comprehensively integrate compensatory strategies [14]. The Eclectic Dysphagia Management Program (EDMP) was developed to address this gap by offering a comprehensive, adaptable approach that tailors interventions to individual patient needs while following a structured therapy regimen.

The EDMP is distinguished by its integration of evidence-based rehabilitative and compensatory strategies. It provides a dynamic framework where therapy is modified based on real-time patient response, ensuring that treatment remains patient-centered. Unlike conventional approaches, EDMP structures therapy into progressive phases that adjust in intensity and focus, thereby optimizing functional swallowing outcomes.

Through session-wise tracking of therapeutic progress, EDMP ensures that each intervention is effectively administered, accounting for variations in patient response and recovery trajectory. Additionally, it establishes specific guidelines for therapeutic dosage, session duration, and dietary adaptations. By incorporating counseling and patient education, the program also promotes long-term adherence and better overall outcomes.

The structured yet adaptable nature of EDMP makes it a promising advancement in dysphagia rehabilitation. By bridging the gap between rigid protocols and highly

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individualized therapy, EDMP enhances treatment efficacy and ensures a more comprehensive approach to dysphagia management.

Methods

Study design

The study was a multi-center randomized controlled trial (RCT) conducted at AYJNISHD, RC, Kolkata, and all units of AMRI Hospitals, Kolkata. The study was carried out over a period of 14 months, from July 2023 to August 2024. A total of 150 patients within the age range of 50-75 years (pilot study: 5 subjects with mean age of 59.9 ± 1.79 years and main study: 145 subjects with mean age of 61.98 ± 4.20 years) having trouble in swallowing, presenting signs and symptoms of oropharyngeal dysphagia with neurogenic aetiology (haemorrhagic and ischemic stroke, TBI, Neurodegenerative disorders) are included. Subjects with a lack of will (abulia), severe cognitive impairment, final-stage dementia, or neurological diseases were excluded.

Participant demographics and clinical profiles

The study included participants with diverse etiologies of neurogenic oropharyngeal dysphagia. Below is a summarized table representing the neurological conditions and comorbidities observed in the cohor [Table 1].

Ethical clearance and IRB approval: Written consent was taken from all the subjects, informing them about the detailed methodology, outcome, and purpose of the research, and permission for further use of the data for analysis and publication was taken. A written approval from the Institutional Review Board (IRB) was obtained, confirming that the study design, procedures, and consent process adhere to ethical standards and ensure the protection of the rights and welfare of the study subjects.

Subject selection criteria: The subjects underwent a comprehensive clinical swallow examination (CSE), including oromotor examination, cranial nerve assessment, Logemann's Four-Finger Test, and Modified Water Swallow Test. The inclusion criteria comprised various physiological impairments of swallowing functions, such as lingual strength and control reduction, delayed pharyngeal swallow reflex, and decreased hyolaryngeal excursion. Exclusion criteria excluded patients with certain conditions like lack of motivation to continue therapy, language disorders, head and neck cancer, and advanced degenerative disorders. The clinical swallow examination [15] tools used for subject selection included Frenchay's Dysarthria Assessment for oromotor examination, Logemann's Four Finger Test, and Modified Water Swallow Test for swallow assessments. The study applied these criteria to create a cohort of 5 subjects who were selected for the pilot study. The final EDMP chart is attached in Appendix 1. The outcome of the pilot study is summarized in Table 2. After this, the remaining 145 subjects were selected based on the same criteria for the main study.

Blinding and Bias Reduction: To minimize bias, a single-blind approach was used during pre-therapy assessments, where participants were blindfolded to prevent external cues from influencing swallowing performance. A double-blind methodology was implemented for outcome measurements, ensuring that both participants and assessors were unaware of therapy conditions to maintain objectivity.

Table 1: Distribution of Neurological Conditions and Comorbidities Among Study Participants.

Neurological Condition	Percentage of Participants (%)
Ischemic Stroke	35%
Hemorrhagic Stroke	20%
Traumatic Brain Injury (TBI)	10%
Parkinson's Disease	15%
Huntington's Disease	5%
Motor Neuron Disease (MND)	5%
Aneurysm-related Dysphagia	5%
Other Neurodegenerative Disorders	5%
Comorbid Conditions	Percentage of Participants (%)
Hypertension	40%
Diabetes Mellitus	35%
Cardiovascular Disease	25%
Chronic Respiratory Conditions	15%
Cognitive Decline/Mild Dementia	20%

Table 2: Outcomes of item analysis based on the expert's rating on the *Eclectic Dysphagia Management Protocol*

No. Of items	No. Of Experts	Cronbach's Alpha
19	5	0.71

Procedure: The study was conducted in four distinct phases to establish a comprehensive therapy regimen for the management of oropharyngeal dysphagia using an eclectic approach.

Phase I: Development and standardization of EDMP

The development of the Eclectic Dysphagia Management Program (EDMP) followed a systematic, stepwise methodology to ensure both scientific rigor and clinical applicability. Initially, a PRISMA-guided systematic literature review was conducted to identify evidence-based rehabilitative exercises, compensatory strategies, sensory stimulation techniques, and neuromuscular electrical stimulation (NMES) approaches relevant to neurogenic oropharyngeal dysphagia. This process ensured that only validated and clinically supported interventions were considered for inclusion. A management strategy tailored to the specific pathophysiology and functional aspects of swallowing was formulated through an extensive review of literature and consultation with experts. This step involved a PRISMA search, where a systematic search strategy using relevant keywords was conducted on Google Scholar and PubMed to identify pertinent resources, as shown in Figure 1. The following keywords were used for the search:

Oropharyngeal dysphagia+ management+ protocol+ eclectic approach+ regimen+ techniques+ compensatory strategies+ rehabilitative strategies; Indian cultures+ food habits+ dietary

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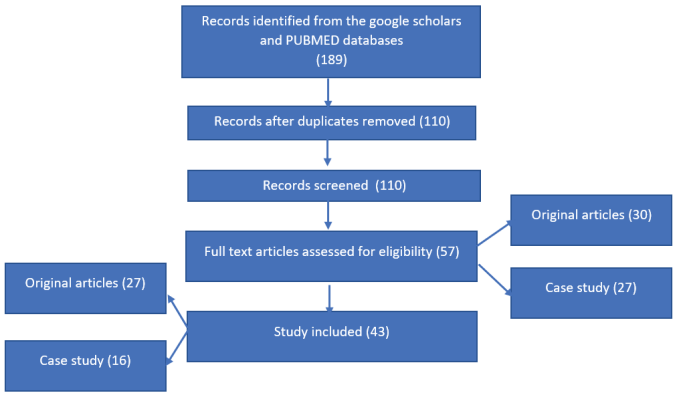

Figure 1: The PRISMA flowchart for scholarly articles.

modification+ diet chart; dysphagia therapy mode+ dysphagia therapy frequency+ therapy duration.

The inclusion criteria encompassed English-language resources published from 1977 onwards, focusing on therapy approaches for oropharyngeal dysphagia management. The development of the Eclectic Dysphagia Management Program (EDMP) chart was a pivotal aspect of Step I.

Development of EDMP Chart: The EDMP chart was structured into four progressive phases, integrating rehabilitative strategies, compensatory techniques, sensory stimulation, NMES, and dietary modifications. The EDMP chart was further refined through clinical consensus from five experts in the field of deglutology, who provided valuable input and recommendations for modifications. Item correlation analysis was conducted by an additional five experts who evaluated the appropriateness of the techniques included in the EDMP.

Pilot Study (N=5): Subsequently, a pilot study involving five separate participants meeting the selection criteria was carried out to validate the viability of the proposed therapeutic regimen before its implementation on the main study's subjects. Necessary modifications were made to session structuring and NMES application based on pilot feedback. Therapy outcomes were measured using FEES, PAS, MASA, and DHI. The study helped refine therapy structuring, optimize session duration, and assess participant response to intervention techniques. This led to key modifications such as refining rehabilitative and compensatory exercises, establishing clear progression criteria, adjusting NMES duration and intensity for better tolerance, defining transition criteria between phases based on swallowing efficiency and airway protection, and optimizing session lengths and repetitions to balance effectiveness with patient endurance.

Phase-II: Main study

The main study commenced once the development and standardization of the Eclectic Dysphagia Management Program (EDMP) were established. This step encompassed the implementation of the EDMP on the selected 145 subjects, involving pre-therapy assessments and subsequent outcome measurements. The pre-therapy assessment began with instrumental assessment, subjective assessment, and quality of life measurement for diagnosing oropharyngeal dysphagia. Instrumental assessment involved Fiberoptic endoscopic evaluation of swallowing (FEES) with Penetration-Aspiration Scale rating [16] using the PENTAX Medical Video Naso-Pharyngo-Laryngoscope. Subjective assessment utilized the Mann Assessment of Swallowing Ability [17], and quality of life was evaluated using the Dysphagia Handicap Index, transadapted and validated in the Bangla Language, as all the subjects in the pilot study (n=5) and main study (n=145) were native Bangla-speakers [18].

Phase III: Implementation of EDMP

EDMP Protocol: The established EDMP protocol was administered on 145 subjects with the therapeutic dosage and duration per week and per day as developed in the finalized EDMP applied on the pilot cohort. The phases description of EDMP, therapy progression, and phase transition is explained in this section. Therapy Sessions (20 Sessions, 3x Per Week, 45–60 min per session):

Phase-1 (Sessions 1–5): Focused on rehabilitative exercises (e.g., tongue resistance, effortful swallowing, and Mendelsohn maneuver). NMES was introduced at 10 minutes per session.

Phase-2 (Sessions 6–12): Integrated compensatory strategies (chin tuck, supraglottic swallow, and dietary modifications). NMES duration was increased to 15 minutes per session.

Phase-3 (Sessions 13–19): Focused on food administration trials with and without compensatory strategies. NMES was increased to 20 minutes per session. Dosage adjustments were made based on swallowing efficiency and physiological response.

Phase-4 (Session 20th): Counseling, discharge planning, and home exercise regimen development. Personalized home exercises were provided for long-term maintenance.

Therapy Progression and Phase Transitions: Participants progressed to the next phase based on improvements in MASA ratings. Exercises were selected for the first and second phases of the programme based on the patient's physiological limitations, and each exercise was performed for 5-7 minutes with a sufficient rest period of 1-3 minutes supplied between the transitions of each exercise. Each session lasted 45 to 60 minutes. In addition to activities, the NMES was offered for 10 minutes during each session of Phase 1, 15 minutes during each session of Phase 2, and 20 Minutes during each session of Phase 3. The activities were repeated at least twice a day as per the subject's need and condition. Transition plan operationally defined as no cessation of previous plan activity, rather continuation of activity in the next phase, until the requirement of the activities is no longer important. Transition criteria were predefined based on swallowing safety, oral intake ability, and response to NMES. For individuals requiring extended therapy, modifications were implemented to optimize outcomes.

To enhance clinical clarity and translational applicability, a concise overview of the EDMP is presented in Table 3 below,

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summarizing the phase-wise therapeutic focus, intervention components, dosage parameters, and predefined transition criteria.

Neuromuscular electrical stimulation was provided during the therapeutic phase of the study. NMES was carried out using a dedicated NMES instrument developed by Spandan electronics has been used as an adjuvant therapy in all the subjects. The specification of the instrument included 80–100 Hz for a pulse duration of 300 µs and current from 1–14 mA and 20min duration, as per the tolerance of the patient. Stimulation will be provided via the surface electrodes, and the skin surface will be prepared before the placement by cleaning the surface using *Neo Prep gel*, and electrodes will be placed in the suprahyoid and infrahyoid muscles [19] with a *conduction gel*. It will be combined with the rehabilitative strategies during feeding.

Selection of muscles to stimulate during NMES: For the current study, a configuration of four electrodes was adopted. These electrodes were placed bilaterally in a horizontal orientation to activate either the infrahyoid or suprahyoid and thyrohyoid muscle groups, as mentioned in Table 4.

Phase-IV: Outcome measures and statistical analysis

This phase involved post-therapy outcome measures, like the pre-therapy assessment, to evaluate changes in swallowing function. The MASA score was tracked across the sessions to monitor progress. The obtained data were compiled using Microsoft Excel. Statistical analysis was carried out, involving descriptive statistics, the Shapiro-Wilks test for normality, the non-parametric Wilcoxon Signed-Rank test, repeated measures ANOVA, LSD for pairwise significant differences, and Cohen's d analysis for effect size measurement. The entire statistical analysis was conducted using SPSS version 20.

Table 3: Phase-wise structure, therapeutic components, dosage, and transition criteria of the Eclectic Dysphagia Management Program (EDMP).

EDMP Phase	Sessions	Key Interventions	NMES Duration	Clinical Focus
Phase I	1–5	Rehabilitative exercises (tongue resistance, Mendelsohn), dry swallow	10 min	Muscle activation, swallow initiation
Phase II	6–12	Compensatory strategies, food trials, and rehabilitative exercises	15 min	Airway protection, bolus control
Phase III	13–19	Functional feeding with/ without strategies	20 min	Swallow efficiency and endurance
Phase IV	20	Counseling, home program, discharge planning	–	Long-term maintenance

Results

The study's primary goal was to create a comprehensive approach for managing neurogenic oropharyngeal dysphagia by developing and standardizing the Eclectic Dysphagia Management Program (EDMP).

Outcomes of item correlation based on the expert's opinion regarding the EDMP protocol

The questionnaire included 19 items (Appendix-1) related to the effectiveness of various swallowing therapy techniques used in EDMP and information regarding phases of EDMP, therapeutic dosage, and termination of therapy. Five experts (4 SLPs and 1 otolaryngologist) rated 19 items related to the EDMP protocol, showing moderate reliability with a Cronbach's alpha of 0.71. Most techniques, including the Mendelsohn maneuver, supraglottic swallow, and NMES, were rated highly effective, while the super-supraglottic swallow was rated somewhat effective. Transition phases and therapy termination received high ratings, though the final session termination suggested the need for potentially more sessions for optimal improvement.

Outcomes of the pilot study

The pilot study involved a pre-therapy and post-therapy comparison of the Mann Assessment of Swallowing Ability (MASA) score, Penetration-Aspiration Scale (PAS) score, and Dysphagia Handicap Index (DHI) score for five participants with neurogenic oropharyngeal dysphagia. The outcomes were analysed using the Wilcoxon Signed Ranks Test, which revealed a statistically significant improvement in all three variables post-therapy compared to pre-therapy scores, as depicted in Table 2. The items assessed in this step are mentioned in Appendix 2.

The findings of the pilot study from Table 2 suggested that the developed Eclectic Dysphagia Management Program (EDMP) protocol may be effective in improving the management of neurogenic oropharyngeal dysphagia. Based on the findings of the validation study and the pilot study, it was determined

Table 4: Session-wise stimulation of muscles group targeted during NMES.

Phase of EDMP	Duration	Muscle groups stimulated	Rationale
Phase-I (first 5sessions)	10 minutes per session	Infrahyoid and thyrohyoid muscles	When the stimulation is presented in the infrahyoid muscle group during swallowing, the downward motion of the hyolaryngeal structures will cause resistance against an upward displacement, which will strengthen the lifting hyolaryngeal muscles (suprahyoid muscles and thyrohyoid muscles). On the other hand, when food is administered together with electrical stimulation that holds the hyolaryngeal complex down, penetration or aspiration may result [28]. In the first five sessions, dry swallowing was used to present motor stimulation to the infrahyoid muscles as an addition to therapeutic exercises.
Phase-II (next 7 sessions)	15minutes per sessions	Suprahyoid and thyrohyoid muscles	In dysphagic individuals with weak muscles and decreased hyolaryngeal elevation, placing electrodes on the suprahyoid muscles may be a safer and more cautious placement technique to achieve hyolaryngeal excursion [28,29]. Hence, these muscles were stimulated when combined with food administration. The stimulation of the thyrohyoid muscles is targeted in all three phases of the EDMP to promote the laryngeal elevation since the active and adequate contraction of the thyrohyoid muscle is crucial for airway protection during swallowing[22].
Phase-III (next 7sessions)	20minutes per sessions		

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that EDMP has the potential to be successfully applied to the large number of subjects with NOD.

Outcomes of the main study

Outcome measure of EDMP: This section specifically delves into the outcomes of the EDMP intervention, utilizing various assessment tools, including FEES, PAS, MASA, and DHI. The pre *vs* post therapy comparison of PAS, MASA score, and DHI scores in the Wilcoxon Signed-Rank Test (n=15) is discussed in Table 5. The results from FEES and PAS, MASA, and DHI assessments are discussed descriptively, and collectively, it affirms the effectiveness of the EDMP intervention in managing neurogenic oropharyngeal dysphagia.

FEES and PAS: As depicted in Table 5, pre-intervention, the mean PAS score was 4, and post-intervention, it reduced significantly to 1. The Wilcoxon Signed-Rank test confirmed the statistical significance of this reduction (p - value = 0.001), indicating the effectiveness of the intervention in reducing the penetration and aspiration risks.

MASA: The pre-intervention mean MASA score was 141.80, while post-intervention, it increased significantly to 175.40, as depicted in Table 5. The Wilcoxon Signed-Rank test showed the change to be statistically significant (p - value = 0.001), demonstrating the intervention's positive impact on participants' swallowing function.

Additionally, the phase-wise comparison of MASA scores tracked participants' progress through each phase of the EDMP, shown in Table 6. Normal distribution of data enabled the application of a one-way ANOVA test, revealing a significant difference in MASA scores across sessions ($p < 0.05$). Pairwise comparisons further validated this, indicating significant improvements in swallowing function between sessions 6 and 20 [Table 7].

Since this data followed normal distribution in Shapiro-wilks test of normality ($p>0.05$), the statistical analysis includes the F-value and p -value of a one-way ANOVA (analysis of variance) test with 42 degrees of freedom (df) and three between-group factors. The p-value indicates the level of significance of the results, with a p-value less than 0.05 indicating statistical significance. Table 6 represents that there is a significant difference in MASA scores across sessions ($F(42,3) = 154.68$, $p = 0.000< 0.05$). The mean scores increased from 141.80 at session 0 to 175.40 at session 20, with a significant difference between each session ($p < 0.05$). This suggested that the subject's swallowing function improved over time, possibly due to the intervention they received. The pairwise comparisons of the mean differences between each session on which the MASA score was obtained, along with their standard errors and p-values, are represented in Table 8.

The results revealed that there are significant mean differences between each session. Specifically, there is a significant decrease in MASA scores from session 0 to the 6th session, with a mean difference of -10.067 ($p < 0.01$), and a further significant decrease from session 0 to the 13th session, with a mean difference of -24.000 ($p < 0.01$), and session 20th, with a mean difference of -33.600 ($p < 0.01$). There are also significant mean differences between the 6th, 13th, and 20th sessions. The mean difference between the 6th and 13th sessions is -13.933 ($p < 0.05$), the mean difference between the 6th and 20th sessions is -23.533 ($p < 0.05$), and the mean difference between the 13th and 20th sessions is -9.600 ($p < 0.05$). Overall, the results suggest significant improvement in swallowing function between sessions 6 and 20.

DHI: In the context of the Dysphagia Handicap Index (DHI), which assesses swallowing-related quality of life, the mean DHI score pre-intervention was 63.47, which significantly decreased to 16.07 post-intervention. This reduction was found to be statistically significant (p - value = 0.001), as depicted in Table 5, affirming the positive impact of the intervention on participants' quality of life.

Table 5: Pilot study outcomes showing Pre vs Post therapy comparison in the Wilcoxon Signed Rank Test (n=5)

Variables	Minimum	Maximum	Mean	SD	|Z|	p-value
MASA	131	157	136.60	11.437	2.023	0.043*
	167	182	172.40	5.941		
PAS	3	6	5	1.414	2.060	0.039*
	1	3	2	1.000		
DHI	59	69	64.00	4.528	2.032	0.042*
	10	23	17.00	4.950		

*Indicates significant at p<0.05 **Indicates Significant at p<0.01

Table 6: Pre vs Post therapy comparison in the *Wilcoxon Signed Rank Test* (n=145) and the effect size of therapy in each variable.

Variables	Test	Minimum	Maximum	Mean	SD	Median	|Z|	p-value	Effect size
MASA	Pre	131	157	141.80	10.16	146.00	3.408	0.001**	0.88
	Post	167	182	175.40	5.00	178.00			
PAS	Pre	3	6	4.60	1.12	5.00	3.477	0.001**	0.90
	Post	1	3	1.53	0.74	1.00			
DHI	Pre	54	69	63.47	4.36	64.00	3.417	0.001**	0.88
	Post	10	23	16.07	4.56	16.00			

Table 7: Phase-wise comparison of the MASA score obtained at the initial sessions of each phase using one-way ANOVA.

Sessions	Mean	SD	F(42,3)	p-value
0	141.80	10.164	154.68	0.000**
6th	151.87	6.854		
13th	165.80	2.513		
20th	175.40	4.997		

*Indicates significant at p<0.05 **Indicates Significant at p<0.01

Table 8: Pairwise comparison of the mean differences between each session on which the MASA score was obtained using one-way ANOVA.

Pairs	Mean Difference	Std. Error	p-value
0-6th	-10.067	1.392	0.000**
0-13th	-24.000	2.334	0.000**
0-20th	-33.600	1.889	0.000**
6th-13th	-13.933*	1.551	0.000**
6th-20th	-23.533*	1.603	0.000**
13th-20th	-9.600*	1.086	0.000**

*Indicates significant at p<0.05 **Indicates Significant at p<0.01.

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Therapeutic Dosage: The section focuses on therapeutic dosage within the context of the EDMP (Eclectic Dysphagia Management Protocol) plan for managing dysphagia. The study explores the duration of individual therapeutic activities provided to participants during 19 therapy sessions. A comprehensive analysis of the duration of different therapy techniques is presented. The duration of each therapeutic approach within the EDMP plan was assessed for its impact on dysphagia management. The findings revealed that each approach had varying durations across the 19 sessions. Descriptive statistics were provided for ten different techniques, including the Mendelsohn manoeuvre, Supraglottic swallow, Super-supraglottic swallow, Masako exercise, Shaker's exercise, Tongue pressure resistance exercise (TPRT), Chin tuck against resistance (CTAR), Neuromuscular Electrical Stimulation, Chin tuck exercise, and sensory stimulation.

Duration of Individual therapy techniques

The mean and standard deviation of the therapy duration were calculated for each technique and descriptively presented in Table 8. The results indicated distinct durations for each approach, influencing the total therapy time provided in each session. Some techniques, such as the Mendelsohn manoeuvre and Supraglottic swallow, were provided for approximately 60 minutes across the 19 sessions. Other techniques, like Shaker's exercise and Chin tuck against resistance (CTAR), were administered for longer durations, around 110 to 120 minutes. Sensory stimulation, on the other hand, was given for a shorter duration, approximately 95 minutes in total.

The study underscores the significance of individualized therapeutic dosage, as the duration of each technique played a crucial role in achieving positive outcomes. Figure 2 represents the graphical presentation of the dosage of individual therapy approach which were adjusted based on patient comfort, tolerance, and overall treatment goals were vital factors considered in determining the appropriate dosage and duration for each therapy approach.

Duration of individual sessions

Furthermore, the duration of individual sessions was analysed, highlighting the variability in therapy duration provided across the 19 sessions for 15 individuals. The mean duration of therapy increased progressively until reaching a maximum in Session 12, after which it decreased gradually. The standard deviation of the mean duration in some sessions was notably high, indicating variability among participants, as depicted in Table 9. In conclusion, the study emphasizes the importance of tailoring therapeutic dosage to individual needs and responses. The EDMP plan demonstrated that each therapy technique required a distinct duration to achieve effective outcomes. The findings provided insights into the dynamic nature of therapeutic dosage within the context of dysphagia management [Table 10].

EDMP: Effect size

Effect size is a statistical measure that indicates the magnitude of the difference between two groups or conditions.

Table 9: Descriptive statistical references of duration of therapy techniques presented to the subjects.

Variables	Minimum	Maximum	Mean	SD	Median
Mendelsohn manoeuvre	65	74	68.40	3.54	66.00
Supraglottic swallow	63	72	67.40	2.38	67.00
Super-supraglottic swallow	61	67	63.60	2.03	63.00
Masako	61	65	62.07	1.16	62.00
Shakers	105	120	109.73	4.23	108.00
Tongue pressure resistance exercise (TPRT)	54	59	56.13	1.36	56.00
Chin tuck against resistance (CTAR)	114	137	119.47	7.54	118.00
Transcutaneous neuromuscular Electrical Stimulation	285	285	285.00	0.00	285.00
Chin tuck	46	68	52.73	7.94	51.00
Sensory stimulation	92	95	94.60	1.06	95.00

Table 10: Descriptive statistical references of the total duration of individual therapy sessions presented to the subjects.

Sessions	Mean	SD
Session 1	42.167	1.4226
Session 2	42.633	1.3292
Session 3	44.900	0.8701
Session 4	46.233	1.2081
Session 5	47.100	0.8904
Session 6	46.933	1.0998
Session 7	52.367	1.3819
Session 8	53.233	1.0154
Session 9	57.567	2.5695
Session 10	59.860	1.1306
Session 11	62.073	1.1841
Session 12	63.267	0.7761
Session 13	45.000	0.9258
Session 14	51.800	0.9411
Session 15	54.633	1.4075
Session 16	55.133	1.4075
Session 17	51.667	12.9762
Session 18	56.267	1.3610
Session 19	56.833	1.3048

In Table 5, the effect size is reported for each of the three variables, namely MASA, PAS, and DHI, and it ranges from 0.88 to 0.90. An effect size of 0.20 is considered small, 0.50 is medium, and 0.80 is large.

The effect size for MASA was d=0.88, indicating a large effect size [20]. This suggests that there was a significant improvement in the MASA scores of the subjects from pre-intervention to post-intervention. The effect size for PAS was also d=0.90, indicating a large effect size [20]. This suggests that there was a significant improvement in the PAS scores of the subjects from pre-intervention to post-intervention. Finally, the effect size for DHI was d=0.88, indicating a large effect size [20]. This suggests that there was a significant improvement in the DHI scores of the subjects from pre-

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intervention to post-intervention. The statistically significant improvements observed in PAS, MASA, and DHI scores have important clinical implications. Reduction in PAS scores reflects enhanced airway protection and reduced penetration–aspiration risk, directly translating to safer oral intake and lower risk of aspiration pneumonia. Improvements in MASA scores indicate meaningful restoration of swallowing physiology, including bolus propulsion, timing, and coordination. The substantial reduction in DHI scores demonstrates improved swallowing-related quality of life, highlighting the functional and psychosocial benefits of EDMP. Furthermore, the large effect sizes (d = 0.88–0.90) across all outcome measures confirm that the observed changes are not only statistically significant but also clinically robust, reinforcing the practical effectiveness of EDMP in real-world dysphagia management.

Discussion

Eclectic management in dysphagia therapy

The concept of eclectic management, also known as integrative management, has gained popularity as an approach to treating medical and behavioral disorders. Eclectic management is also relevant in the treatment of speech, language, and swallowing disorders. A study [5] highlighted the importance of eclecticism in speech-language pathology, particularly in the context of voice therapy for individuals with hyperfunctional voice disorder (HFVD) in the Indian context [5]. This approach integrates various therapeutic modalities to customize treatment plans based on individual patient needs, which is especially important in dysphagia management due to the diverse etiologies and symptomatology of the condition. The program was developed using a systematic, stepwise approach to ensure scientific rigor and clinical relevance. A PRISMA-guided literature review informed the selection of evidence-based rehabilitative exercises, compensatory strategies, sensory stimulation techniques, and neuromuscular electrical stimulation (NMES) interventions specific to neurogenic oropharyngeal dysphagia, ensuring inclusion of only clinically validated components. Subsequently, expert consensus was obtained from experienced speech-language pathologists and an otolaryngologist specializing in dysphagia management. This stage facilitated refinement of therapy components, phase structuring, dosage parameters, and transition criteria, ensuring clinical feasibility and relevance. Item correlation analysis further strengthened the content validity of the EDMP protocol. A pilot study was then conducted to evaluate feasibility, patient tolerance, session structuring, and preliminary therapeutic effectiveness. Feedback from this phase informed critical modifications, including optimization of NMES duration, exercise sequencing, and phase transition criteria. Finally, the refined EDMP was implemented in the main study involving a larger cohort, allowing systematic evaluation of therapeutic outcomes. This sequential development process underscores the methodological robustness and translational strength of the EDMP framework.

Effectiveness of EDMP compared to standard dysphagia therapies

The findings of this study highlight the effectiveness of the Eclectic Dysphagia Management Program (EDMP) in improving swallowing function in individuals with neurogenic oropharyngeal dysphagia. Compared to standard dysphagia therapies, which often emphasize either compensatory techniques or rehabilitative strategies, EDMP uniquely integrates rehabilitative exercises, compensatory techniques, sensory stimulation, and neuromuscular electrical stimulation (NMES) into a structured yet adaptable framework. This **phased progression model** allows patients to transition from basic exercises to functional oral intake, ensuring individualized adaptation at each stage based on their clinical needs and response to therapy. The EDMP framework derives its effectiveness from the synergistic integration of multiple therapeutic components, each addressing distinct physiological aspects of swallowing. Rehabilitative exercises such as the Mendelsohn maneuver, Shaker exercise, and tongue resistance training primarily target muscle strength, coordination, and hyolaryngeal excursion. Compensatory strategies, including chin tuck and supraglottic swallow, immediately enhance airway protection and bolus control, reducing aspiration risk during oral intake. Sensory stimulation facilitates improved swallow initiation and bolus awareness, particularly in individuals with delayed pharyngeal response. NMES acts as an adjunctive modality, enhancing neuromuscular recruitment and reinforcing volitional swallowing exercises. While each component contributes independently, their combined application within a structured, phase-wise program enables functional recovery that is greater than any single modality alone, thereby justifying the integrated EDMP approach.

Multimodal approach and individualized therapy

A key strength of EDMP is its **multimodal approach**, which combines various evidence-based interventions to address different physiological impairments. The use of NMES in conjunction with rehabilitative exercises provides targeted muscle activation, enhancing the neuromuscular coordination necessary for safe swallowing. Additionally, the program's **structured progression** ensures that therapy intensity, exercise selection, and dietary modifications are **customized** based on individual assessments, including FEES, PAS, and MASA scores. This adaptability distinguishes EDMP from conventional dysphagia therapy models, which often lack a comprehensive framework for therapy progression.

A recent study [21] examined the effectiveness of a dynamic exercise-based swallowing intervention in older adults with dysphagia. The intervention consisted of a combination of various exercises, including effortful swallows, Mendelsohn maneuvers, tongue-hold swallows, supraglottic swallows, Shaker exercises, and effortful pitch glides [21]. Nine participants completed an 8-week treatment protocol, with weekly sessions and daily home practice [21]. The results of the study showed significant improvements in swallowing physiology, including the initiation of the pharyngeal swallow, laryngeal elevation, and reduction of pharyngeal residue, as indicated by improved MBSImP scores [21]. Although the reduction in median Penetration-Aspiration Scale scores was not statistically significant ($p=0.67>0.05$) [21]. These findings suggest that a combination of these exercises can effectively

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improve swallowing function and physiology in healthy older adults with dysphagia [21]. The study found that a combination of exercises to improve swallow function, patient education on proper posture and swallowing techniques, and psychological support led to improvements in both swallow function and quality of life [21]. Similarly, a study [22] was on an eclectic approach to the management of dysphagia in a patient with head and neck cancer. Throughout the course of treatment, a variety of exercises and modalities were employed. These included voice exercises such as loud vocalisations, vocal fold adduction exercises, and gliding along the pitch scale; oral motor exercises such as tongue stretches and jaw release; tongue strength training using the Iowa Oral Performance Instrument; NMES and sEMG using VitalStim Plus equipment; expiratory muscle strength training for follow-up at home; and a home plan for oral motor exercises [22]. This case study demonstrates the benefit of an eclectic strategy employing NMES with innovative electrode placements and sEMG in the management of severe dysphagia and improving quality of life [22].

Development and standardization of EDMP

The development of an Eclectic Dysphagia Management Program (EDMP) showcases the comprehensive approach to managing neurogenic oropharyngeal dysphagia. The program combines various therapeutic strategies, exercises, and techniques in a structured manner to address different aspects of dysphagia management. The EDMP protocol incorporates expert opinions, evidence-based approaches, and a pilot study to create a standardized regimen that aims to improve swallowing function and reduce complications related to dysphagia. In consonance with this, a case-controlled study [23] developed the McNeill Dysphagia Therapy Programme [23], a structured exercise-based rehabilitation framework for swallowing remediation, tested against conventional swallowing therapy methods combined with surface electromyography (sEMG) biofeedback. Comparing the McNeill Dysphagia Therapy Programme treatment group to the standard therapy with biofeedback group, case patients were more likely to show signs of dysphagia recovery at the post treatment re-evaluation, resulting in a dysphagia reduction of 69% [23]. When compared to conventional dysphagia therapy plus sEMG biofeedback, the McNeill Dysphagia Therapy Programme produced better results [23].

Therapeutic dosage, duration, and individualization

The EDMP encompassed various therapeutic exercises and interventions, leading to significant improvements in swallowing function. The program's impact was measured using tools such as the Mann Assessment of Swallowing Ability (MASA) [17], Penetration Aspiration Scale (PAS) [16], and Dysphagia Handicap Index (DHI) [18], revealing substantial effect sizes across these measures. The study emphasized the crucial role of therapeutic dosage and duration in achieving positive outcomes. Sessions were structured with a gradual increase and subsequent decrease in therapy duration, accommodating individual responses and needs. Variability in session durations underscored the importance of tailoring treatment plans to individual differences. These findings are consistent with prior research, indicating that a higher frequency of therapy sessions and appropriate dosing contribute to improved dysphagia management outcomes. Studies have shown that swallowing therapy can be effective in improving swallowing function in patients with dysphagia, but the optimal duration and frequency of therapy sessions are still debated. Although the current study clearly supported the importance of a higher number of sessions and flexibility in the duration of individual sessions, as depicted in the figure 2. Various studies have found to stand in consonance with the current findings. According to research, a prescription for treatment of dysphagia can be divided into four important and essential components of exercise dose: repetitions, intensity, frequency (sets), and duration [24,25]. In summary, figure 2 & 3 provide valuable information about the duration of therapy provided in each session of the EDMP plan for 15 individuals. The therapy plan appears to have been designed to gradually

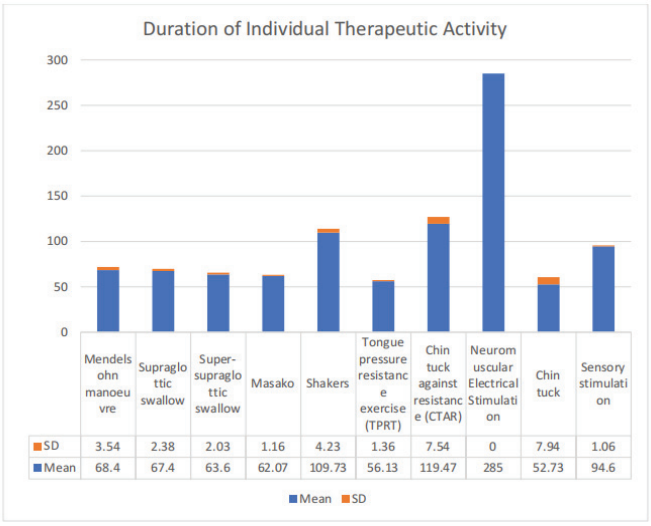

Figure 2: Graphical Representation of the Mean Duration of an Individual therapeutic exercises presented during the EDMP.

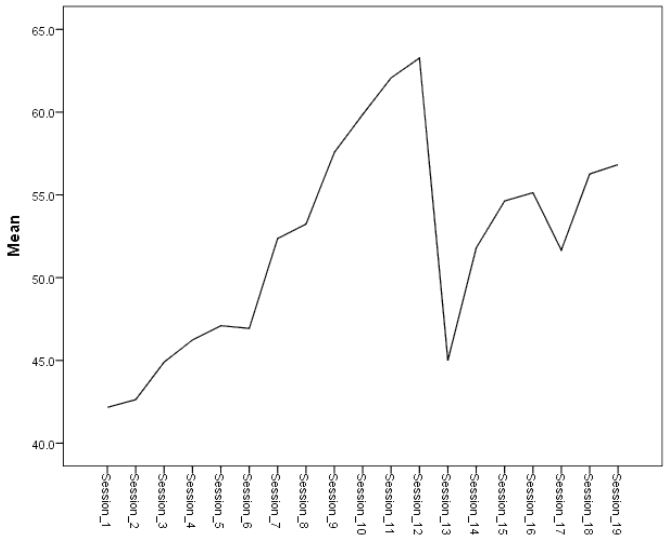

Figure 3: Line graph representation of progression and changes in the duration of sessions of EDMP.

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increase and then decrease the duration of therapy, with some variability in the duration of therapy provided to different individuals in some sessions. This underscores the importance of individualizing therapy to meet the specific needs of each patient and adjusting the dosage and duration of therapy based on their response to treatment. Studies have shown that swallowing therapy can be effective in improving swallowing function in patients with dysphagia, but the optimal duration and frequency of therapy sessions are still debated [25,26]. Although the current study clearly supported the importance of a higher number of sessions and flexibility in the duration of individual sessions, as depicted in the figure 2. Various studies have found to stand in consonance with the current findings. One such study [26] investigated how swallowing exercise dosages are recorded and what dosages are reported in the context of stroke rehabilitation. In addition, they investigated the relationship between mean daily swallowing repetitions and the likelihood of improvement in swallowing function, as well as how swallowing exercise dosages in practise compared to evidence-based neural plasticity and strength training principles [26]. Over the course of 18 months, we reviewed the medical records of 42 patients with post-stroke dysphagia who were admitted to an inpatient rehabilitation unit [26]. Participants' characteristics, swallowing exercises, dosages, and clinical outcomes were recorded. Using logistic regression analysis, the relationship between dosage and outcomes was studied [26]. On average, patients attended 2.4 swallowing intervention sessions per week (IQR: 1.7) over the course of 21 days (IQR: 16) and performed 44.5 swallowing exercise repetitions per session (IQR: 39.6) [26]. The findings revealed inconsistent reporting of ingested exercise dosages [26]. In medical records, frequency, intervention duration, exercise type, and number of repetitions were routinely recorded, but intensity, session length, content, and adherence to home exercise programmes were not [26]. In contrast to research studies, the frequency of swallowing interventions was lower in clinical practise, and swallowing exercises did not adhere to specificity or progressive resistance principles [26]. The likelihood of swallowing status improvement was partially explained by age (B = -0.015, p =.007) but not by the average daily repetitions of swallowing exercises [26]. Hence, in line with these findings, the current study also illustrates clinically applicable swallowing exercise concentrations.

Limitations of the Study

Despite these promising results, the study acknowledges certain limitations. While the sample size (N=150) was sufficient for initial validation, further multi-center randomized controlled trials (RCTs) are necessary for broader generalizability. Although bias was minimized through double-blinded assessments, individual differences in therapy adherence may have influenced outcomes. Additionally, while clinical assessments (FEES, PAS, MASA) were used to measure improvements, incorporating advanced kinematic analyses could provide more precise insights into physiological changes.

Future directions and long-term vision

Future research should focus on expanding EDMP through multi-site collaborations, conducting a large-scale RCT comparing EDMP with other dysphagia interventions, and implementing long-term follow-up studies to assess sustainability and relapse prevention. Moreover, incorporating adjunctive interventions such as biofeedback and cortical stimulation could further enhance therapeutic outcomes. By addressing these aspects, EDMP can continue to evolve into a standardized yet customizable dysphagia management program, improving clinical outcomes and quality of life for individuals with neurogenic oropharyngeal dysphagia.

Conclusion

The outcomes of the EDMP have demonstrated its effectiveness in improving swallowing function and overall quality of life for individuals with dysphagia. Compensatory strategies have been successful in reducing the risk of aspiration and improving bolus flow, while targeted exercises have led to increased swallowing strength and efficiency.

The Eclectic Dysphagia Management Program (EDMP) provides a comprehensive and evidence-based approach to dysphagia management, emphasizing accurate assessment, individualized therapy planning, and patient-centered outcomes. By incorporating a multidisciplinary approach and utilizing a variety of therapeutic techniques, the EDMP has shown promising results in improving swallowing function and enhancing the overall well-being of individuals with dysphagia. Further research and continued implementation of the EDMP will contribute to the advancement of dysphagia management practices and ultimately improve the lives of those affected by this challenging condition.

Authors' contributions

The authors were responsible for the conceptualization and design of the study. Data collection, clinical assessment, and administration of assessment tools were carried out by the authors. Data analysis and interpretation were performed by the authors. The manuscript was drafted, reviewed, and approved by the author(s), who take full responsibility for the integrity and accuracy of the work.

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Availability of data and materials

The data and materials supporting the findings of this study are available from the author(s). Additional data will be provided upon reasonable request.

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(Appendix-1,2)

Reference

1. Kern MK, Jaradeh S, Arndorfer RC, Shaker R. Cerebral cortical representation of reflexive and volitional swallowing in humans. Am J Physiol Gastrointest Liver Physiol. 2001;280(3):G354–G360. Available from: https://doi.org/10.1152/ajpgi.2001.280.3.g354

2. Rommel N, Hamdy S. Oropharyngeal dysphagia: manifestations and diagnosis. Nat Rev Gastroenterol Hepatol. 2016;13(1):49–59. Available from: https://doi.org/10.1038/nrgastro.2015.199

3. Stanescu I, Dogaru G. Swallowing disorders in clinical practice: functional anatomy, assessment and rehabilitation strategies. Balneo Res J. 2014;5(3):127–133. Available from: https://bioclima.ro/Balneo%20(73).pdf

4. Himani. Eclectic therapy: types, techniques, benefits and drawbacks. Mantra Care. 2022 Jun 30. Available from: https://mantracare.org/therapy/eclectic-therapy/

5. Boominathan P, Mahalingam S, Arunachalam R, Venkatesh L. An eclectic voice therapy pogram for the treatment of hyperfunctional voice disorders (HFVD). J Voice. 2021. Advance online publication. Available from: https://doi.org/10.1016/j.jvoice.2021.05.017

6. Lazarus C, Logemann JA, Huang CF, Rademaker AW. Effects of two types of tongue strengthening exercises in young normals. Folia Phoniatr Logop. 2003;55(4):199–205. Available from: https://doi.org/10.1159/000071019

7. Roberts H, Lambert K, Walton K. The prevalence of dysphagia in individuals living in residential aged care facilities: a systematic review and meta-analysis. Healthcare (Basel). 2024 Mar 13;12(6):649. Available from: https://doi.org/10.3390/healthcare12060649

8. Adkins C, Takakura W, Spiegel BMR, Lu M, Vera-Llonch M, Williams J, Almario CV. Prevalence and characteristics of dysphagia based on a population-based survey. Clin Gastroenterol Hepatol. 2020;18(9):1970–1979.e2. Available from: https://doi.org/10.1016/j.cgh.2019.10.029

9. Banda KJ, Chu H, Kang XL, Liu D, Pien LC, Jen HJ, Hsiao STS, Chou KR. Prevalence of dysphagia and risk of pneumonia and mortality in acute stroke patients: a meta-analysis. BMC Geriatr. 2022;22(1). Available from: https://doi.org/10.1186/s12877-022-02960-5

10. Sasegbon A, Hamdy S. The anatomy and physiology of normal and abnormal swallowing in oropharyngeal dysphagia. Neurogastroenterol Motil. 2017;29(11):e13100. Available from: https://doi.org/10.1111/nmo.13100

11. Speyer R, Baijens L, Heijnen M, Zwijnenberg I. Effects of therapy in oropharyngeal dysphagia by speech and language therapists: a systematic review. Dysphagia. 2013;28(4):387–400.

12. Balsubramanium RK, Bhat JS. Manipal manual for swallowing assessment. Manipal: Manipal Universal Press; 2012. Available from: https://books.google.co.in/books/about/Manipal_Manual_for_Swallowing_Assessment.html?id=Lm3wDwAAQBAJ&redir_esc=y

13. Dziewas R, Allescher HD, Aroyo I, Bartolome G, Beilenhoff U, Bohlender J, Breitbach-Snowdon H, Fheodoroff K, Glahn J, Heppner HJ, Hörmann K, Ledl C, Lücking C, Pokieser P, Schefold JC, Schröter-Morasch H, Schweikert K, Sparing R, Trapl-Grundschober M, Wallesch C. Diagnosis and treatment of neurogenic dysphagia: S1 guideline of the German Society of Neurology. Neurol Res Pract. 2021;3(1). Available from: https://doi.org/10.1186/s42466-021-00122-3

14. Cheng F, Kovács IA, Barabási AL. Network-based prediction of drug combinations. Nat Commun. 2019;10(1). Available from: https://doi.org/10.1038/s41467-019-09186-x

15. McCullough GH, Martino R. Clinical evaluation of patients with dysphagia: importance of history taking and physical exam. In: Manual of diagnostic and therapeutic techniques for disorders of deglutition. New York: Springer; 2012. p. 11–30. Available from: https://link.springer.com/chapter/10.1007/978-1-4614-3779-6_2

16. Rosenbek JC, Robbins JA, Roecker EB, Coyle JL, Wood JL. A penetration-aspiration scale. Dysphagia. 1996 Spring;11(2):93–98. Available from: https://doi.org/10.1007/bf00417897

17. Mann G. MASA: the Mann assessment of swallowing ability. Clifton Park (NY): Thomson Learning; 2002. Available from: https://www.carolinatherapy.net/wp-content/uploads/MASA.pdf

18. Pal P, Chatterjee I. Transadaptation and validation of the dysphagia handicap index in Bangla. Int J Otorhinolaryngol Head Neck Surg. 2024 Oct;10(5):487–494. Available from: https://doi.org/10.18203/issn.2454-5929.ijohns20242703

19. Kim S, Oh BM, Han T, Jeong HJ, Sim Y. Different movement of hyolaryngeal structures by various applications of electrical stimulation in normal individuals. Ann Rehabil Med. 2015;39:535–544. Available from: https://doi.org/10.5535/arm.2015.39.4.535

20. Sawilowsky SS. New effect size rules of thumb. J Mod Appl Stat Methods. 2009;8(2):597–599. Available from: https://doi.org/10.22237/jmasm/1257035100

21. Balou M, Herzberg EG, Kamelhar D, Molfenter SM. An intensive swallowing exercise protocol for improving swallowing physiology in older adults with radiographically confirmed dysphagia. Clin Interv Aging. 2019;14:283–288. Available from: https://doi.org/10.2147/cia.s194723

22. Kelvin LS, Radika SR. Holistic eclectic approach to management of a patient with dysphagia secondary to head and neck cancer: a case study. Singapore Med J. 2021;62(12):670–671. Available from: https://doi.org/10.11622/smedj.2021238

23. Carnaby-Mann GD, Crary MA. McNeill dysphagia therapy program: a case control study. Arch Phys Med Rehabil. 2010;91:743–749. Available from: https://doi.org/10.1016/j.apmr.2010.01.013

24. Choy J, Pourkazemi F, Anderson C, Bogaardt H. Dosages of swallowing exercises in stroke rehabilitation: a systematic review. Eur Arch Otorhinolaryngol. 2023;280(3):1017–1045. Available from: https://doi.org/10.1007/s00405-022-07735-7

25. Krekeler BN, Rowe LM, Connor NP. Dose in exercise-based dysphagia therapies: a scoping review. Dysphagia. 2021;36(1):1–32. Available from: https://doi.org/10.1007/s00455-020-10104-3

26. Ferguson B. ACSM's guidelines for exercise testing and prescription. 9th ed. J Can Chiropr Assoc. 2014;58(3):328. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC4139760/

27. Mwanza DS. The eclectic approach to language teaching: its conceptualisation and misconceptions. Int J Humanit Soc Sci Educ. 2017;4(2):53–67. Available from: https://www.arcjournals.org/pdfs/ijhsse/v4-i2/6.pdf

28. Poorjavad M, Talebian Moghadam S, Nakhostin Ansari N, Daemi M. Surface electrical stimulation for treating swallowing disorders after stroke: a review of the stimulation intensity levels and the electrode placements. Stroke Res Treat. 2014;2014:918057. Available from: https://doi.org/10.1155/2014/918057

29. Park JW, Kim Y, Oh JC, Lee HJ. Effortful swallowing training combined with electrical stimulation in post-stroke dysphagia: a randomized controlled study. Dysphagia. 2012;27(4):521–527. Available from: https://doi.org/10.1007/s00455-012-9403-3

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