

EFFECTIVENESS OF RAFTAS AND MASAKO MANUEVER ON FINE MOTOR CONTROL AND DYSPHAGIA IN DYSARTHRIA CLUMSY HAND SYNDROME OF LACUNAR STROKE - A SIMPLE EXPERIMENTAL STUDY

¹Rajkumar.S.K, ²Mohana.C, ³Meena.S.

¹Principal, ²Assistant Professor, ³Professor
Swamy Vivekananda Physiotherapy College Namakkal, Tamil Nadu.
Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai.

Abstract-

BACKGROUND: Dysarthria clumsy hand syndrome refers to a combination of facial weakness, severe dysarthria, dysphagia and mild hand weakness and incoordination. This condition is most frequent after an internal capsule or pontine stroke. This study concentrates on dysphagia and clumsy hand features of lacunar stroke. RAFTAS which is repeated Arm Function after Stroke is the application of repeated functional and recovery activities immediately in the post six months of lacunar stroke and masako maneuver is a dry swallowing technique to improve swallowing ability. This study concentrates on the application of RAFTAS and masako maneuver in fine motor control and dysphagia in dysarthria clumsy hand syndrome of lacunar stroke.

AIM & OBJECTIVE: To find out the effect of RAFTAS and masako maneuver on fine motor control and dysphagia in dysarthria clumsy hand syndrome of lacunar stroke.

Methodology: 20 subjects of age group 50- 65 years, who fulfilled the inclusion Criteria were selected. Out of 30 subjects of lacunar stroke 20 subjects with less than six months of onset and with symptoms of dysphagia and clumsy hand syndrome who were able to cooperate and understand were selected.

RESULT: The pre-test and post-test mean values of fine motor control (NINE HOLE PEG TEST) was analyzed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value 21.26 Since the calculated 't' value was greater than table 't' value null hypothesis is rejected. The pre-test and post-test mean values of dysphagia (EAT- 10 SCORE) was analyzed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value 12.61 Since the calculated 't' value was greater than table 't' value null hypothesis is rejected.

CONCLUSION: This study it can be concluded that application of RAFTAS and masako maneuver showed significant improvement in fine motor control and dysphagia in dysarthria clumsy hand syndrome of lacunar stroke.

Keywords: Lacunar stroke, Dysphagia, clumsy hand syndrome, RAFTAS, masako maneuver, fine motor control.

INTRODUCTION:

Lacunar infarction refers to small subcortical infarct from the occlusion of single perforating artery. Lacunar infarction accounts for 25 % of all ischemic stroke. The anatomic distribution of lacunar infarction is most commonly the basal ganglia (Globus pallidus, thalamus, caudate) and pontine regions. The mechanism of lacunar infarct is microatheroma formation at the origin of penetrating arteries from major cerebral arteries like middle cerebral artery, distal basilar artery. Dr. Miller fisher first described the arterial pathology under lacunas .Most commonly lacunar syndromes affect the elderly with long standing hypertension .These lacunar infarcts usually cause symptoms over minutes to hours but may progress with a stuttering course. There are over 20 lacunar syndromes that have been described, but the most common are pure sensory stroke, sensorimotor stroke and dysarthria clumsy hand syndrome .Dysarthria clumsy hand syndrome is the least common of all lacunar syndrome. Patient present with facial weakness, dysarthria, dysphagia and dysmetria / clumsiness of one upper extremity. Dysphagia is a condition affecting normal swallowing physiology leading to difficulty in swallowing food and liquid. Clinical manifestation of dysphagia is the subjective feeling of swallowing stagnation, pain during swallowing or complete loss of swallowing ability. Dysphagia is classified as oropharyngeal or oesophageal depending on location. Oropharyngeal dysphagia is a major disorder following stroke with high incidence in acute post stroke patients. In oropharyngeal dysphagia dysfunction of transfer of food bolus

occurs in between the pharynx and upper oesophageal sphincter. Clumsy hand syndrome involves weakness of the hand which often are most prominent when patient is writing. The clumsy hand was described as bradykinetic and the lesion site was subcortical white matter underlying supplementary motor area. The dysarthria clumsy hand syndrome was treated with masako maneuver and Repeated Arm Functional Task after Stroke (RAFTAS). The masako maneuver is a swallowing rehabilitation technique to improve problems of swallowing functions caused by stroke. The masako maneuver is an oropharyngeal exercise rehabilitation technique to enhance the function of the constriction pharyngeus superior. This technique is mainly performed to strengthen its function of pushing food bolus from the oral cavity to pharynx by strengthening the contact between the tongue base and laryngo pharyngeal wall. The exercise was conducted for 20 minutes a day for five days for 4weeks. This maneuver was performed by inducing dry swallowing. This improved function of pharynx constriction by strengthening muscle strength of tongue base, by helping coordination of larynx and improving constriction of pharynx and airway obstruction during pharyngeal swallowing. The aim of orofacial physiotherapeutic approach is to strengthen swallowing musculature (facial, suprahyoid, infrahyoid) to recover its tone, power, movement amplitude, speed and coordination. Repetitive arm functional tasks after stroke also known as repetitive functional task practice is a promising treatment to upper limb recovery following stroke. Following a stroke, people who received repetitive task training showed greater improvements in performing functional tasks. The aim of the study was to find the effect of RAFTAS and masako maneuver on fine motor control and dysphagia in dysarthria clumsy hand syndrome of lacunar stroke.

METHODOLOGY:

It was a simple experimental study of 20 subjects of lacunar syndrome and having clinical feature of both dysphagia and clumsy hand syndrome. The study setting was at outpatient department of Swamy Vivekananda Physiotherapy College and the study duration is about 3 months and the study sampling was convenient sampling technique. Inclusion criteria includes lacunar stroke with less than six months of onset and with clinical features of oropharyngeal dysphagia and clumsy hand syndrome and having the ability to understand and co-operate throughout the session. The exclusion criteria includes old lacunar stroke case, patient with unstable medical conditions, non-cooperative conditions, tracheostomy case. The parameters used for the analysis of fine motor control and dysphagia includes nine hole peg test and EAT- 10 score.

PROCEDURE:

The aim and objectives of the study was explained to the participants of the study. 20 subjects were chosen based on inclusion and exclusion criteria. The subjects were clearly explained about the study procedure and training protocol. The subject is instructed to present on particular date and time. Fine motor control and dysphagia was measured using nine hole peg test and EAT - 10 Scale .The treatment technique was given and post treatment fine motor control and dysphagia was also analysed.

TREATMENT TECHNIQUE:

RAFTAS TECHNIQUE:

Frequency : Two times per day
Intensity : Each activity is done 20 times
Type : Functional activities and recovery activities (20 times)
Duration : 4 weeks

RAFTAS- Repeated Arm Functional Task After Stroke	MORNING SESSION/EVENING SESSION
FUNCTIONAL ACTIVITIES	Washing Dressing (Upper body dressing, lower body dressing, buttoning) Eating Drinking Combing
RECOVERY ACTIVITY (DONE PARTLY)	1)Picking up a cup (Reaching the cup Picking the cup) 2)Writing (holding the pen trying to write) 3)Reading

	(holding the book Turning the pages) 4)Using Mobile phone 5)Holding the key 6)Holding water bottle 7)Finger oppositions 8)Prehension activity 9) Precision handling (Holding paper between fingers).
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The activity can be progressed based on the coordination level, mental processing level and upper limb strength. Activity log sheets were maintained for the range of improvement during each week and final assessment was done after four weeks of intervention.

MASAKO MANUEVER:

Patient position : Relaxed sitting with proper support

Technique (Type) : The exercise is performed by asking the patient to protrude the tongue between the front teeth holding it in place by gently biting down on the anterior portion of the tongue and maintain this posture while swallowing saliva.

Frequency : 3 times per day for 5 days per week.

Intensity : 3 sets of 10 repetitions.

DATA ANALYSIS:

NINE HOLE PEG TEST:

Mean values (s)		Calculated value	't' Table 't' value	Level of Significance
Pre test	Post test			
60.0	32.5	21.26	1.729 (one tail)	P < 0.05 Significant

The pre test and post test mean values of nine hole peg test was analysed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value 21.26 . Since the calculated 't' value was greater than table 't' value null hypothesis is rejected.

EAT – 10 SCORE :

Mean values (questionnaire)		Calculated value	't' Table 't' value	Level of Significance
Pre test	Post test			
21.00	1.45	12.61	1.729 (one tail)	P < 0.05 Significant

The pre test and post test mean values of EAT – 10 SCORE was analyzed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value 12.61. Since the calculated 't' value was greater than table 't' value null hypothesis is rejected.

RESULTS:

The pre test and post test analysis of fine motor control and dysphagia was assessed using nine hole peg test and EAT 10 Score and the test score revealed that there was a significant improvement in fine motor control and dysphagia after the application of functional activities and recovery activities in repeated arm functional task after stroke And oropharyngeal physiotherapeutic training in masako maneuver.

DISCUSSION:

The aim of the study was to find the application of masako maneuver a method of oropharyngeal physiotherapeutic intervention and repeated arm functional tasks after stroke on swallowing ability and fine motor control in lacunar stroke case. 20 male subjects aged 50 – 65 years was applied with these techniques. The cases with dysarthria clumsy hand syndrome was immediately approached within 3 months of post stroke which is considered the most reasonable time for enrolling into treatment session .The individual was also given a handbook and exercise regimen chart which includes the feedback report , functional activity picture demonstration, recovery activities performance methods. In case of difficulty in performing the activities, parting is done in which the activities can be performed as two phase

.Functional or task specific practice is underpinned by the movement science approach to stroke rehabilitation .Repetitive functional task practice seeks to enhance motor learning by undertaking practice of functionally relevant tasks. Cochrane overview of systematic reviews found moderately quality evidence that arm function following a stroke can be improved by repetitive task training. Other important components includes intensity of practice, active involvement and feedback on performance .The lacunar stroke cases of dysarthria on treating with masako maneuver showed improvement in swallowing ability. This maneuver also found to reduce the episodes of aspiration .This rehabilitative approach targets the underlying swallowing. According to haewon beyon et al, the masako maneuver improves tongue muscle strength, suprahyoid muscle activation and improves swallowing coordination to protect the airway. The masako maneuver is the base of tongue exercise .The base of tongue is the pump that pushes food through throat into oesophagus .This exercise is designed to strengthen the base of tongue where tongue movement plays a major role. The anterior retraction can help patient to improve the swallowing ability.

CONCLUSION:

The aim of study is to find out the effect of RAFTAS and masako maneuver on fine motor control and dysphagia among lacunar stroke cases with dysarthria clumsy hand syndrome. 20 lacunar stroke cases were selected and assessed. Those who had Nine Hole Peg Test score more than 55 seconds and EAT- 10 Score value of greater than 3. Out of 30 members 20 subjects were selected. They received the prescribed intervention.

The fine motor control and swallowing ability was measured before and after treatment session (4 weeks) by using nine hole peg test and EAT – 10 Score Pre test and post test values of the study was collected and assessed for significant difference and their results were analyzed by using paired‘t’ test.

This study concluded that RAFTAS and masako maneuver improved fine motor control and swallowing ability after 4 weeks of intervention among lacunar stroke patients with dysarthria clumsy hand syndrome.

REFERENCES:

1. Mok.V, Kim Js.Prevention and management of cerebral small vessel disease.J Stroke. 2015 May; 17(2):111- 22.
2. Feekes JA, Hsu SW, Chaloupka JC, Cassell MD.Tertiary microvascular territories define lacunar infarcts in the basal ganglia. Ann Neurol.2005 Jul; 58(1): 18 – 30.
3. Jackson C, Sudlow C. comparing risks of death and vascular events between lacunar and non-lacunar infarction. Brain. 2005 Nov; 128(Pt 11): 2507-17.
4. Prasanth Venkataraman, Prasanna tadi; Forshing Lui .Lacunar syndromes.National libraray of medicine. January 7, 2023.
5. Effect of shaker exercise and Masako Manuever on Swallowing Function and Quality of life in patients with dysphagia following stroke: An interventional comparative study. International Journal of physiotherapy and research. Vol 11 (4): 4611- 20.
6. Choi JB, Shim SH,Yang JE, Kim HD, Lee DH, Park JS. Effect of shaker exercise in stroke survivors with oropharyngeal dysphagia.Neurorehabilitation 2017 Jan 1; 41(4): 753 – 7.
7. LogemannJA, Rademaker A , Pauloski BR, Kelly A, Stangl- Mc Breen c, Antinoja J, Grande B, Farquharson J, K ern M, Easterling C , Shagr R. A randomized study comparing the shaker exercise with traditional therapy: a preliminary study. Dysphagia . 2009 Dec 1; 24(4):403.
8. Byeon H. Effect of the masako maneuver and neuromuscular electrical stimulation on the improvement of swallowing function in patients with dysphagia caused by stroke. Journal of Physical therapy science 2016; 28(7): 2069- 2071.
9. Brick et al. Repetitive functional tasks after stroke (RAFTAS) a pilot randomized controlled trial. Pilot and feasibility studies. DOI 10.1186/s40814 – 016- 0088- 5.
10. Rodgers H , Mackintosh J, Price C, Wood R , McNamee P, Fearon T, , Marritt A, Curless R, Does an early increased intensity interdisciplinary upper limb therapy programme following acute stroke improve outcome? Clin Rehabil.2003.17:579- 589.
11. Arya KN, Verma R, Gard RK, Sharma VP, Agarwal M, Aggarwal GG. Meaningful Task Specific Training (MTST) for stroke rehabilitation: a randomized controlled trial. Top Stroke Rehabil. 2012; 19:193- 211.
12. Pandian S, Arya KN, Davidson EW. Comparison of Brunnstorm movement therapy and motor relearning program in rehabilitation of post stroke hemiparetic hand: a randomized trial.J Body Mov Ther. 2012; 16: 330 – 7.
13. Harris JE, Eng JJ, Miller WC, Dawson AS. A self-administered Graded Repetitive Arm Supplementary Program (GRASP) improves arm function during stroke rehabilitation; a multisite randomized controlled trial. Stroke. 2009.; 40. 2123- 8.
14. Arboix A, Bell Y, Garcia, Erolesl, Massons J, Comes E, Balcells M, Targac. Clinical study of 35 patients with dysarthria clumsy hand syndrome. J Neurol Neurosurg Psychiatry 2004; 75: 231- 234.
15. Schmahmann JD, Ko R, Mac More J. The human basis Pontis : motor syndromes and topographic organization – Brain. 2004; 127: 1269- 1291.