

Temporomandibular Joint Dysfunction And Swallowing Difficulties In Stroke - An Observational Study” To International Journal Of Dentistry And Oral Science

Research Article

Nithin Kumar S^{1*}, D. Malarvizhi²

¹ B.P.T Intern, SRM College of Physiotherapy, Faculty of Medicine and Health Sciences, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur-603203, Kanchipuram, Chennai, Tamilnadu, India.

² Professor, SRM College of Physiotherapy, Faculty of Medicine and Health Sciences, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur-603203, Kanchipuram, Chennai, Tamilnadu, India.

Abstract

Background: The prevalence of stroke patient having Temporomandibular joint dysfunction is 30%-60%. 23 % of the subject have difficulty in swallowing after stroke. In stroke patient, the Temporomandibular joint function and Dysphagia are prevalent, due to involvement of the masticatory muscles. Hence on rehabilitation of stroke patients, due consideration has to be given to Temporomandibular joint function and dysphagia.

Objective: To observe the Temporomandibular joint dysfunction and swallowing difficulties in stroke.

Methodology: Non experimental design, 10 subjects were selected by convenient sampling and Temporomandibular joint function and swallowing difficulty were assessed.

Outcome: Craniomandibular Index (CMI) and The Modified Mann Assessment of Swallowing Ability (MMASA). **RESULTS:** This study shows that 100% of the samples in this study were found to have temporomandibular joint dysfunctions associated with stroke. 30% of the stroke population was found to have been affected with dysphagia as a cause of temporomandibular joint dysfunction associated with stroke.

Conclusion: The study concluded that Temporomandibular joint dysfunction is present among the stroke patients with mild swallowing difficulties of 30%. Hence stroke patients should also be assessed with Temporomandibular joint function and swallowing difficulties to prevent dysfunction, stroke management protocol should include Temporomandibular joint treatment.

Keywords: Stroke; Temporomandibular Joint Dysfunction; Dysphagia; Craniomandibular Index; MMASA.

Introduction

According to World Health Organization Stroke is defined as “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin” [1]. In India, the stroke prevalence rate is 84-262/100,000 in rural areas and 334-424/100,000 in urban areas. According to recent population-based reports, the incidence rate is 119-145/100,000. [2] The neurovascular anatomy of stroke is regulated by two internal carotid and vertebral arteries, and the pathophysiology of stroke is characterized as impaired perfusion in the arteries of the brain.

Approximately 30%-60% of patients with stroke have temporomandibular joint dysfunction. [3], 23 % of the subject have difficulty in swallowing after stroke. Brunnstorm stages plays a major role in stroke recovery, in this study stage two was taken as in this stage depicts the appearance of basic limb synergies beginning of spasticity. [4] Temporomandibular joint is formed by multiple bones which includes mandible, zygomatic, sphenoid, temporal and hyoid bones. [5] Both osteokinematic and arthrokinematics movements are important for the normal functioning of the temporomandibular joint which includes movements like depression, elevation, retrusion, protrusion, left and right lateral excursions, gliding and distraction of the mandible. [6]

*Corresponding Author:

Nithin Kumar S,
B.P.T Intern, SRM College of Physiotherapy, Faculty of Medicine and Health Sciences, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur-603203, Kanchipuram, Chennai, Tamilnadu, India.
Tel: +91-9677076622
E-mail: nithinostwal@gmail.com

Received: September 18, 2021

Accepted: November 13, 2021

Published: November 23, 2021

Citation: Nithin Kumar S, D. Malarvizhi. Temporomandibular Joint Dysfunction And Swallowing Difficulties In Stroke - An Observational Study” To International Journal Of Dentistry And Oral Science. *Int J Dentistry Oral Sci.* 2021;8(11):5109-5112. doi: <http://dx.doi.org/10.19070/2377-8075-210001028>

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The temporomandibular joint is one of the most commonly used joint which is engaged during mastication, swallowing, speaking. Primary and secondary muscles of temporomandibular joint are supplied by the mandibular nerve which is branch of trigeminal nerve and facial nerve from cranial nerve. The superficial temporal, anterior tympanic, deep temporal, auricular posterior, transverse facial, middle meningeal, and maxillary arteries, as well as their branches, are the primary arterial outlets for the lateral and medial temporomandibular joints, according to research.[7] Abnormalities of the intra-articular discal location, as well as dysfunction of the underlying musculature, are symptoms of temporomandibular joint dysfunction. Painful joint noises, limited or deviated range of motion, and cranial or muscle pain, also known as orofacial pain, are some of the symptoms and signs.

Dysphagia is known as difficulty in swallowing, which is most common in stroke patients where it shows clinical manifestation such as choking, coughing, packing of food in cheeks. which leads to malnutrition and dehydration.[8] Although 42-67% people have been reported with swallowing difficulties, there may be mild changes based on severity of condition, type of stroke (psychometric evaluation). 23% of dysphagia was found to be in the early stage of stroke and affects the quality of life. (Psychometric evaluation).[9]

Involvement of lesion in brain stem can cause loss of sensation of mouth, lip and cheek and loss of trigger response of laryngeal elevation, closing of glottic and relaxation of cricopharyngeal, voluntary control of the mastication can be interrupted by the lesion of cortical region, and also cause contralateral impairment of lip, tongue, muscle motor control by involvement of precentral gyrus [10]. The second most noted dysfunction with stroke is craniomandibular problem, musculoskeletal problem from of temporomandibular joint disease to connective tissue pain syndrome. In stroke patient, the TMD and Dysphagia are prevalent, due to involvement of the masticatory muscles. These muscles should be assessed and treated in stroke rehabilitation. This study helps to assess and diagnose the temporomandibular joint dysfunction and dysphagia.

Materials And Methods

This non-experimental study of observational type was conducted among stroke patients. the sampling was done using convenient sampling method. The sample consist of Ischemic stroke patients between the age group of 45-55 years and under the brunstrom stage 2 of recovery. the data was collected between January and march 2021. IEC 2227/IEC/2020 dated on 04.12.2020 was obtained before starting the study and the participants were selected based on the inclusion and exclusion criteria. An informed consent was obtained after detailed explanation of the study and the demographic data was collected.

Patients with unstable vitals, arthritis, deformity, fracture and infections of the temporomandibular joint were excluded. the following assessment tool was used for data collection. The test evaluates higher centre function with the total scores of 30 points. we selected moderate and above moderate, between the score of 18-30. Assessment was done with proper safety and precautionary methods by using gloves, mask, and hand sanitizer. Index devel-

opment consists of two types, generation and definition. Scoring, and testing. Abnormal findings were assessed from joints, muscles in the initial phase. Craniomandibular index haven't been concentrated much in among stroke patients. This study enhances the influence of inappropriate mandibulo-temporal joint function and swallowing difficulties in stroke patients and Craniomandibular Index and Modified Mandibular Swallowing Assessment is used as a measurement tool to diagnose. The components of the Craniomandibular Index are Dysfunction Index (DI), Palpation Index (PI), the DI and PI includes restrictions of joint movements, crepitus, along with palpation of the muscles respectively.

The Craniomandibular Index (CMI) was created to provide a quantitative indicator of mandibular movement disorders, temporomandibular joint noise, and muscle and joint tenderness for use in epidemiological and clinical outcome studies. CMI has inter-rater reliability of 0.84 for the Dysfunction Index, 0.87 for the Palpation Index, and 0.95 for the Craniomandibular index (CMI), intra-rater reliability of 0.92 for the Dysfunction Index, 0.86 for the Palpation Index, and 0.96 for the CMI.

The Modified MASA (MMASA) is developed as a screening tool for dysphagia in stroke, it is an examination for evaluating dysphagia in bed side and the components of this assessment shows the standard risk for dysphagia and aspiration. It evaluates 12 skills on oro-motor and sensory components. it's a physician-administered screening tool for dysphagia in acute stroke with the validity of 0.82, sensitivity of 87-92% and specificity of 84-86%. [11]

Results

The purpose of the study is to determine the prevalence of temporomandibular joint dysfunctions and swallowing difficulties in stroke patients. Table 1 and Figure 1 represents the value of craniomandibular index and it shows that 100% of the study samples in this study were found to have temporomandibular joint dysfunctions associated with stroke. Table 2 and Figure 2 depict the score of Modified Mann Assessment of Swallowing Ability (MMASA) and from this study 30% of the stroke population was found to have been affected with dysphagia as a cause of temporomandibular joint dysfunction associated with stroke.

Discussion

In this study 15 patients with stroke were assessed and among them only 10 subjects were selected based on the inclusion and exclusion criteria. Among our population 100% of the patients were affected with temporomandibular joint dysfunction in associated with 30% of the patients affected with dysphagia. To rule out the temporomandibular joint dysfunction craniomandibular index (CMI) was used. on assessing the temporomandibular joint in stroke patients' wide range of movement difficulties were found, while dysphagia is one among them with high risk in stroke patients, the commonly found clinical features of temporomandibular joint dysfunction and dysphagia are minimal temporomandibular deviation and restrictions during opening of mouth. This can lead to lack of appetite, dehydration and jaw deformities indirectly related with patient's health status.

Volkan Yilmaz et.al., (2020) have stated that patients affected with haemorrhagic stroke were 73.3% and ischemic stroke were

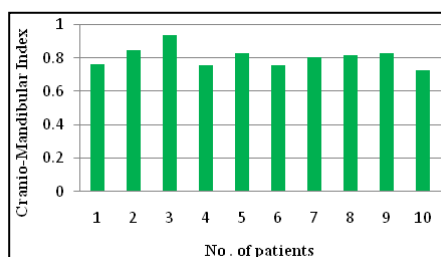
Table 1. Value Of Cranio-Mandibular Index (CMI).

S.NO	CMI VALUE	Frequency (n)
1	0.73	1
2	0.76	2
3	0.77	1
4	0.81	1
5	0.82	1
6	0.83	2
7	0.85	1
8	0.94	1
9	Total	10

Table 2. Values Of Modified Mann Assessment Of Swallowing Ability (MMASA) With Stroke Patients.

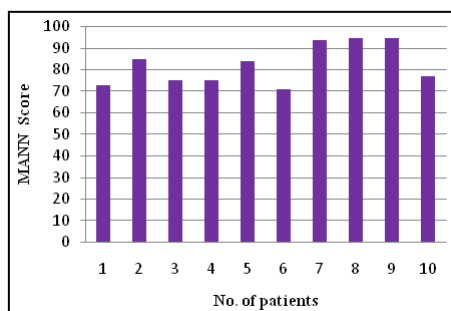
S.NO	Score	Frequency (n)
1	71	1
2	73	1
3	75	2
4	77	1
5	84	1
6	85	1
7	94	1
8	95	2
9	Total	10

Figure 1. Cranio-Mandibular Index (CMI)



Represents the value of craniomandibular index and it shows that 100% of the study samples in this study were found to have temporomandibular joint dysfunctions associated with stroke.

Figure 2. Values Of Modified Mann Assessment Of Swallowing Ability (MMASA) With Stroke Patients.



Depict the score of Modified Mann Assessment of Swallowing Ability (MMASA) and from this study 30% of the stroke population was found to have been affected with dysphagia as a cause of temporomandibular joint dysfunction associated with stroke.

26.7%. affected with temporomandibular joint dysfunction. Also suggest the current therapeutic approach should also focus on Temporomandibular joint alignment to prevent its dysfunction which results in dysphagia. Interpretation and recovery of stroke was assessed based on Brunnstrom stages. patients in this stage have spasticity and mild involuntary movements appears towards

recovery so this stage were included with high feasibility of sample size.

Paciaroni M Oh et.al., concluded the prevalence of dysphagia was found to be moderately high. The scale of the lesion was more significant than its placement in terms of anatomical-clinical as-

sociation. Dysphagia was a major predictor of death and injury at 90 days as measured clinically. [12] The rhythmic movements of the jaw with peripheral sensory inputs shows that central nervous system CNS reflects the oral motor behaviours of mastication. [13] The motor control of the masticatory muscles is more localized and motor unit classifications is less distinct. by these special features the masticatory muscles have a finer movement and gradation of force that the trunk and limb muscle.

This study goes along with Duck-Won Oh et.al., (2013) suggested that restoration of the head and neck, TMJ postural alignment to improve the functional ability of stomatognathic alignment. Patients with post-stroke hemiparesis may benefit from stomatognathic alignment exercises to enhance temporomandibular joint control and swallowing.

According Olmos SR et.al. stated that the complex of crania cervical and mandibular region including muscles and ligament were associated with postural abnormality causes temporomandibular joint dysfunction in stroke patients. [14] The biomechanical analysis of temporomandibular joint is the most unique in structure and has complex function. The joint muscles, ligaments and articulating capsules plays a major role in mastication. [15] The oromotor stimulation is given to stroke patients to facilitate the muscles in and around jaw, this technique will help to initiate mastication, speech and swallowing. to execute this technique proper assessment and diagnosis of oro-motor is needed. this study focuses on the detailed examination and interpretation of temporomandibular joint dysfunction and dysphagia among stroke patients.

Aknowledgement

I Thank my guide prof. Malarvizhi and Mr. Pavan kumar who spared his time and helped me whenever I needed. I also thank patients who spent there time and helped me in completion of

this study.

References

- [1]. Truelsen T, Begg S, Mathers C. The global burden of cerebrovascular disease. Geneva: World Health Organisation. 2000.
- [2]. Pandian JD, Sudhan P. Stroke epidemiology and stroke care services in India. *J Stroke*. 2013 Sep;15(3):128-34. PubMed PMID: 24396806.
- [3]. Gordon C, Hewer RL, Wade DT. Dysphagia in acute stroke. *Br Med J (Clin Res Ed)*. 1987 Aug 15;295(6595):411-4.
- [4]. Gordon C, Hewer RL, Wade DT. Dysphagia in acute stroke. *Br Med J (Clin Res Ed)*. 1987 Aug 15;295(6595):411-4.
- [5]. O'Sullivan SB, Schmitz TJ, Fulk G. *Physical rehabilitation*. FA Davis; 2019 Jan 25.
- [6]. Levangie PK, Norkin CC. *Joint structure and function: a comprehensive analysis*.
- [7]. Friction JR, Schiffman EL. Reliability of a craniomandibular index. *J Dent Res*. 1986 Nov;65(11):1359-64. PubMed PMID: 3478399.
- [8]. Teasell R MD, Hussein N. *Clinical consequences of stroke. Evidence-Based Review of Stroke Rehabilitation*. Ontario: Heart and Stroke Foundation and Canadian Stroke Network. 2016:1-30.
- [9]. Yılmaz V, Aras B, Umay E. Temporomandibular Joint Dysfunction and Impaired Stomatognathic Alignment: A Problem Beyond Swallowing in Patients With Stroke. *Indian J Otolaryngol Head Neck Surg*. 2020 Sep;72(3):329-334. PubMed PMID: 32728543.
- [10]. Seo JH, Kim DK, Kang SH, Seo KM, Seok JW. Severe Spastic Trismus without Generalized Spasticity after Unilateral Brain Stem Stroke. *Ann Rehabil Med*. 2012 Feb;36(1):154-8. PubMed PMID: 22506250.
- [11]. Antonios N, Carnaby-Mann G, Crary M, Miller L, Hubbard H, Hood K, Sambandam R, Xavier A, Silliman S. Analysis of a physician tool for evaluating dysphagia on an inpatient stroke unit: the modified Mann Assessment of Swallowing Ability. *J Stroke Cerebrovasc Dis*. 2010 Jan;19(1):49-57. PubMed PMID: 20123227.
- [12]. Paciaroni M, Mazzotta G, Corea F, Caso V, Venti M, et al. Dysphagia following stroke. *European neurology*. 2004;51(3):162-7.
- [13]. vanEijden TM, Turkawski SJ. Morphology and physiology of masticatory muscle motor units. *Crit Rev Oral Biol Med*. 2001;12(1):76-91. PubMed PMID: 11349964.
- [14]. Olmos SR, Kritz-Silverstein D, Halligan W, Silverstein ST. The effect of condyle fossa relationships on head posture. *Cranio*. 2005 Jan;23(1):48-52. PubMed PMID: 15727321.
- [15]. Soboļeva U, Lauriņa L, Slaidiņa A. The masticatory system--an overview. *Stomatologija*. 2005;7(3):77-80. PubMed PMID: 16340271.