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Research Article

EFFICACY OF MCKENZIE'S METHOD OF THERAPY IN SUBJECTS WITH TEMPOROMANDIBULAR JOINT DISORDERS: AN EXPERIMENTAL STUDY

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A R T I C L E I N F O

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McKenzie's technique, temporomandibular joint disorders, Fonseca's questionnaire, inter-incisor mouth opening, Numeric pain rating scale.

A B S T R A C T

Study Design: Pre-post experimental study.
Background and Objectives: Temporomandibular disorder is an umbrella term used for any condition associated with the jaw joint. Any blow to the jaw, Temporomandibular joint or muscles of the jaw can be the absolute cause for TMD. Moreover other causes that can lead to TMD are clenching of teeth and grinding by exerting more pressure on TMJ. Presence of osteoarthritis or rheumatoid arthritis, dislocation of disc and stress can lead to tightening jaw and facial muscles.
Methods: Thirty subjects were included in the study with TMD. These subjects received McKenzie method of mechanical diagnosis and therapy for 1 session. Subjects were evaluated for baseline characteristics and functional disability using Numeric pain rating scale (NPRS), Inter- incisor mouth opening pre and post treatment and then the data was analyzed.
Results: The difference between pre and post of NPRS and inter- incisor opening in the subjects were statistically highly significant (p=0.0001).
Conclusion: McKenzie's method of mechanical diagnosis and therapy is an effective technique in decreasing the pain intensity and increasing the inter-incisor mouth opening in subjects with temporomandibular joint disorders.

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INTRODUCTION

Temporomandibular disorder is an umbrella term used for any condition associated with the jaw joint. Any blow to the jaw, temporomandibular joint or muscles of the jaw can be the absolute cause for TMD. Moreover other causes that can lead to TMD are clenching of teeth and grinding by exerting more pressure on TMJ. Presence of osteoarthritis or rheumatoid arthritis, dislocation of disc and stress can lead a person to tighten jaw and facial muscles or clench his teeth[1-7]. The most commonly seen TMJ disorders are internal derangement, pain dysfunction, arthritis and trauma. Recent literature shows that females are more affected as compared to males[8-12]. TMD are also referred to as "Mandibular dysfunction", "Temporomandibular dysfunction" and "Craniomandibular dysfunction". TMD has prevalence rate of 10-20% of the world population and is most commonly seen in the age group ranging from 20-40 years[13-16].

These TMD's are usually classified separately from pathologies associated with their joints. TMD's are classified into 2 major types first one is structural this is caused due to overloading of jaw, trauma, systemic diseases and structural aberration; and the second is postural this is caused due to tissue deformation, adherence of surface and structural diseases[16,17].

Presenting signs and symptoms of TMD are Interminent or persistent pain in the masticatory muscles or TMJ, Limitation or deviation of mandibular movements, TMJ sounds. A variety of other persistent symptoms such as tinnitus, abnormal swallowing and hyoid bone tenderness also occur. Quality of life may be affected, with a negative effect on social function, emotional health and energy levels[18,19].

Conservative and non-invasive treatments are mostly provided for the improvement in the symptoms and are recommended in the initial management of TMD[20]. Physical therapist are often included along with the dental professionals for management of TMD[21].

Along with medical or dental management a wide range of physical manual therapies are been used such as joint mobilization, exercise prescription, electrotherapy, biofeedback and relaxation techniques and postural correction in TMD[22-24]

McKenzie method of mechanical diagnosis and therapy is a commonly used classification- based approach for the management of joint pain[25-27]. It is a biomechanical approach based on the classification in the non-specific mechanical

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syndromes that guide the specific directional exercises such as flexion and extension. These exercises are determined by positive symptom response such as centralization or abolition of pain. Centralization is the abolition of distal pain in response to sustained end range posture and repetitive movements. Evidence for the reliability and treatment validity of centralization has been demonstrated by a number of studies. Evidence for the importance of specific exercises linked to directional preferences has also been demonstrated[28-31].

METHODS

This study was approved by institutional review committee and was conducted in conformity with the principles outlined in declaration of Helsinki.

Participants

Subjects were recruited from Oromaxillary OPD of tertiary care hospitals at Belagavi. Thirty participants were included in the study from tertiary care hospital. The inclusion criteria were: Pain and loss of range of motion in the temporomandibular joint, Post-operative cases of zygomaticus arch fractures or mandible fractures and maxillofacial surgeries, History of presenting symptoms > 1month, Age group 20-65 years, Participants willing to participate in the study. The exclusion criteria were: History of secondary TMJ pathologies, malignant tumors of face and jaw, History of temporomandibular joint dislocation and hypermobile temporomandibular joint, and any neurological or cognitive deficits. After meeting the inclusion and exclusion criteria subjects were included in the study respectively.

Interventions*:* The study received approval from Institutional Ethical Review Committee. The purpose of the study was explained and the subjects diagnosed by dental professionals having unilateral or bi-lateral TMD based on clinical findings or imaging technique and were included in the study. They were screened based on the inclusion and exclusion criteria. A written informed consent and demographic details was obtained from the subject and they were further assessed for outcome measures like assessment of numeric pain rating scale, inter-incisor mouth opening, and fonseca's questionnaire. These measures were evaluated pre and post-treatment intervention after giving McKenzie's technique for the joint.

McKenzie's technique: The patients head is in relaxed position and rested on pillow. The therapist then asks the patient to open and close the jaw in a unilateral direction several times and then followed with therapist overpressure at the end range exerted and this is repeated for 10-12 times/ 3 sets, based on the McKenzie's principle of centralization which includes repeated movements along with sustained postural holds at the end range(figure.1).

Outcome Measure

Numeric pain rating scale- The Numeric Rating Scale (NRS - 11) is a 11 - point scale for patient self - reporting of pain. The patient is asked to make three pain ratings , corresponding to current , best and worst pain experienced over the past 24 hours. The average of the 3 ratings was used to represent the patient's level of pain over the previous 24 hours[32].

Inter-incisor mouth opening- It will be measured using a plastic ruler. The distance between the upper central incisor and the lower central incisors will be determined as the inter-incisor mouth opening[33].

Fonseca's questionnaire- It is set of comprising 10 questions which will be used to evaluate the severity of TMD. The subjects will be informed and explained that the 10 questions should be answered with "yes" or "no" or "sometimes" and that only one answer should be marked for each question, for analysis the answers yes, no or sometimes from each questionnaire will be tallied and total will be multiplied by the value attributed to each answer ten, five and zero respectively. The final value will be compared to the clinical index and the subjects will be classified are per TMD degree[34].

RESULTS

The statistical analysis was done using SPSS software for statistical measures such as mean, standard deviation, paired t test and test of significance.

Kolmogorov-Smirnov Z test was applied to analyze the normality Numeric pain rating scale and Inter- incisor mouth opening.

Comparison of pre-treatment scores and post treatment scores were analyzed using students paired t test.

Demographic details

The mean age of subjects in the study was found to be 37.56±10.85 and the duration of symptoms was 7.96±5.20. Male to female ratio in the study was 20:10. (Table 1)

Table 1

Demographic Characteristics	Mckenzie's Group
Age (years)	37.56±10.85
Gender (M:F)	20:10
TMJ affected (Lt: Rt :B/L)	11:16:3
Duration of symptoms (in months)	7.96±5.20

P value = <0.001

Numeric pain rating scale

NPRS was used to assess the severity of pain. There was reduction in pain observed in the participants after undergoing a session with McKenzie's method of therapy. There was 48.71% of change in the intensity of pain that occurred after the treatment. The NPRS scores reduced from 5.8±1.16 (baseline) 3.9±1 (post intervention) (table 2) (graph 1). The mean difference before treatment and after treatment scores was 1.9. The p value by paired t test was found to be 0.0001 which is highly significant.

Table 2

Time	Mean	Mean diff.	STD diff.	Percentage of change	t-value	p-value
Pre Post	5.8±1.16 3.9±1	1.9	0.1622	48.71%	15.7	0.0001

Graph.1

Inter- incisor opening

Measuring tape was used to assess the inter-incisor mouth opening. Inter-incisor mouth opening distance increased from 29.93±6.787 (baseline) to 40.6±4.215 (post treatment) (table.3) (graph.2). A mean difference of 10.67 was observed between the pre -treatment and post-treatment. There was 26.28% of change was observed after receiving the treatment. The p value by paired t test was found to be 0.0001 which is highly significant.

Table 3

Time	Mean	Mean diff.	STD diff.	Percentage of change	t-value	p-value
Pre Post	29.93±6.787 40.6±4.215	10.67	2.572	26.28%	13.607	0.0001

Graph 2

DISCUSSION

This current study describes the successful management of temporomandibular joint disorders using the principles of mechanical diagnosis and therapy.

McKenzie's method of mechanical diagnosis and therapy does not make specific patho-anatomical diagnosis but rather is specifically based on the symptomatic and mechanical response to repeated movement and sustained end range holds using therapist applied overpressure. According to these responses the subjects were classified into derangement syndrome and demonstrated rapid improvement in pain as well as improvement in the range of motion of temporomandibular joint following the application of active repeated movement and sustained end range postural holds. It could be concluded that source of the pain was due to articular disc of TMJ, and indeed derangement of the disc and is commonly used in classification of TMJ disorders[8].

When repeated movement followed by sustained end range postural holds abolished the pain and increased range of motion, further examination was unnecessary as the treatment strategy was concluded. The MDT clinical reasoning firstly considers presence of any one of the three mechanical syndromes namely postural, dysfunction and derangement syndromes. Presenting symptoms of subjects and response to repeated movements, derangement was the only mechanical syndrome that was possible[30]. Results in pain reduction were found to be significant (48.71%) in the temporomandibular joint. As suggested by Littlewood *et al* that pain will persist until the involved tissues are remodeled by loading the impairment with repeated active movements and sustained end range holds. He also suggested that loading should be sufficient enough to cause elevation of pain followed by decrease in the intensity once the repeated active movements are ceased[35].

Improvement in the range of motion showed statistical difference (26.28%) as this correlates to a study conducted by Aina and May *et al* where repeated movements and sustained holds at the end range were able to abolish the pain as well as helped in improving the joint range of motion. MDT technique applied to derangement syndrome showed improvement in symptoms as the repeated end range loading in appropriate direction, which is as termed directional preference helped in pain reduction and improving range[36].

Limitations

The limitations in the study were that long-term follow up in this study was not monitored. The overpressure applied during the MDT was not measured and the examiner was not blinded.

Future Scope

The study can be done with a large sample size to get better and appropriate results. Longer follow up periods are recommended and comparison with other techniques can be done.

CONCLUSION

McKenzie's method of mechanical diagnosis and therapy is an effective technique in decreasing the pain intensity and increasing the inter-incisor mouth opening in subjects with temporomandibular joint disorders.

References

1. Barbick, M., M. F. Dolwick, S. Rose, and S. Abramowicz. Adaptibility of Biomet Lorenz tmj prosthesis to joints that were previously treated with the tmj concepts custom joint prosthesis. Oral Med. Oral Pathol. *Oral Radiol. Endod*. 106(2):e17, 2008. doi:10.1016/j.tripleo. 2008.05.058.
2. Chase, D. C., J. W. Hudson, D. A. Gerard, R. Russell, K. Chambers, J. R. Curry, J. E. Latta, and R. W. Christensen. The Christensen prosthesis: a retrospective clinical study. *Oral Surg. Oral Med. Oral Pathol*. 80:273-278, 1995.
3. Gadd, A., and T. Goswami. Temporomandibular disorder and joint replacement. *Biomed. Mater.,* Paper No. BMWRANL-7PJRW3, 2009
4. Hansdottir, R., and M. Bakke. Joint tenderness, jaw opening, chewing velocity, and bite force in patients with temporomandibular joint pain and matched healthy control subjects. *J. Orofac. Pain* 18:108-113, 2004.
5. De Leeuw R (ed). Orofacial pain: guidelines for classification, assessment, and management. 4th ed. Chicago: Quintessence; 2008.
6. Tanaka, E., M. S. Detamore, K. Tanimoto, and N. Kawai. Lubrication of the temporomandibular joint. *Ann. Biomed. Eng.* 36(1):14-29, 2008. doi:10.1007/s10439007-9401-z.
7. Tanaka, E., D. P. Rodrigo, Y. Miyawaki, K. Lee, K. Yamaguchi, and K. Tanne. Stress distribution in the temporomandibular joint affected by anterior
8. disc displacement: a three-dimensional analytic approach with the finite-element method. *J. Oral Rehabil.* 27(9):754-759, 2000. doi:10.1046/j.1365-2842.2000.00597.x.
9. Detamore, M. S., and K. A. Athanasiou. Structure and function of the temporomandibular joint disc: implications for tissue engineering. *J. Oral Maxillofac. Surg.* 61(4):494-506, 2003. doi:10.1053/joms.2003.50096.

10. Detamore, M. S., K. A. Athanasiou, and J. Mao. A call to action for bioengineers and dental professionals: directives for the future of TMJ bioengineering. *Ann. Biomed. Eng.* 35(8):1301-1311, 2007. doi:10.1007/s10439-007-9298-6.
11. van Loon, J. P., L. G. M. de Bont, B. Stegenga, F. K. L. Spijkervet, and G. J. Verkerke. Groningen temporomandibular joint prosthesis: development and first clinical application. *Int. J. Oral Maxillofac. Surg*. 31(1):44-52, 2002. doi:10.1054/ijom.2001.0175.
12. Warren, M. P., and J. L. Fried. Temporomandibular disorders and hormones in women. *Cells Tissues Organs* 169:187, 2001. doi:10.1159/000047881.
13. Pedroni CR, De Oliveira AS, Guaratini MI. Prevalence study of signs and symptoms of temporomandibular disorders in university students. *J Oral Rehabil.* 2003;30:283-289.
14. Nassif NJ, Al-Salleeh F, Al-Admawi M. The prevalence and treatment needs of symptoms and signs of temporomandibular disorders among young adult males. *J Oral Rehabil*. 2003;30:944-950.
15. Taylor M, Suvinen T, Reade P. The effect of Grade IV distraction mobilization on patients with temporomandibular pain-dysfunction disorder. *Physiotherapy Theory and Practice*. 1994;10:129-136.
16. Bertolucci LE, Gray T. Clinical analysis of mid-laser versus placebo treatment of arthralgic TMJ degenerative joints. *Cranio*. 1995;13(1): 26-29.
17. Ingcrvall B, Mohlin B, Thilander B. Prevalence of symptoms of functional disturbances of the masticatory sysretn in Swedish men. *J Oral Rehabil* 1980;7:185-197.
18. Ramfjord S, Ash MM. Occlusion, ed 3. Philadelphia: Sajnders. 1983:259-261.
19. Dworkin SF, Huggins K, Wilson L *et al*. A randomized clinical trial using research diagnostic criteria for temporomandibular disorders: axis I to target clinic cases for a tailored self-care TMD program. *J Orofac Pain*. 2002;6:48-63.
20. Hall LJ. Physical therapy results for 178 patients with temporomandibular joint syndrome. *Am J Otolaryngol*. 1984;5:183-196.
21. Syrop S. Initial management of temporomandibular disorders. *Dentistry Today*. 2002;21(8):52-57
22. Glass EG, Glaros AG, MsGlynn FD. Myofascial pain dysfunction: treatments used by ADA members. *Cranio*. 1993;11(1):25-29.
23. Di Fabio RP. Physical therapy for patient with TMD: a descriptive study of treatment, disability, and health status. *J Orofac Pain*. 1998;12: 124-135.
24. Dworkin SF, Huggins K, Wilson L *et al*. A randomized clinical trial using research diagnostic criteria for temporomandibular disorders: axis I to target clinic cases for a tailored self-care TMD program. *J Orofac Pain*. 2002;6:48-63
25. Sturdivant J, Friction JR. Physical therapy for temporomandibular disorders and orofacial pain. *Curr Opin Dent.* 1991;4:4885-4896.
26. Foster NE, Th ompson KA, Baxter GD, Allen JM. Management of nonspecifi c low back pain by physiotherapists in Britain and Ireland: A descriptive questionnaire of current clinical practice. *Spine* 1999;24:1332-1342
27. Gracey JH, McDonough SM, Baxter GD. Physiotherapy management of low back pain: A survey of current practice in Northern Ireland. *Spine* 2002;27:406-411.
28. Jackson DA. How is low back pain managed? Retrospective study of the fi rst 200 patients with low back pain referred to a newly established community-based physiotherapy department. *Physiotherapy* 2001; 87:573-581.
29. McKenzie RA. Th e Lumbar Spine: Mechanical Diagnosis and Th erapy. Waikanae, New Zealand: Spinal Publication Ltd, 1981.
30. McKenzie RA. Th e Cervical and Th oracic Spine: Mechanical Diagnosis and Th erapy. Waikanae, New Zealand: Spinal Publication Ltd, 1990.
31. McKenzie RA, May S. Th e Lumbar Spine Mechanical Diagnosis and Th erapy. 2nd ed. Waikanae, New Zealand: Spinal Publication New Zealand Ltd, 2003.
32. McKenzie RA, May S. Th e Cervical and Th oracic Spine Mechanical Diagnosis and Th erapy. 2nd ed. Waikanae, New Zealand: Spinal Publication New Zealand Ltd, 2006.
33. Hjermstad MJ, Fayers PM, Haugen DF, Caraceni A, Hanks GW, Loge JH, Fainsinger R, Aass N, Kaasa S, European Palliative Care Research Collaborative (EPCRC. Studies comparing Numerical Rating Scales, Verbal Rating Scales, and Visual Analogue Scales for assessment of pain intensity in adults: a systematic literature review. *Journal of pain and symptom management.* 2011 Jun 30;41(6):1073-93.
34. Walker N, Bohannon RW, Cameron D. Discriminant validity of temporomandibular joint range of motion measurements obtained with a ruler. *Journal of Orthopaedic & Sports Physical Therapy.* 2000 Aug;30(8):484-92
35. Nomura K, Vitti M, Oliveira AS, Chaves TC, Semprini M, Siéssere S, Hallak JE, Regalo SC. Use of the Fonseca's questionnaire to assess the prevalence and severity of temporomandibular disorders in Brazilian dental undergraduates. *Brazilian dental journal*. 2007;18(2):163-7.
36. Littlewoods C, May S. Case report: A contractile dysfunction. Manual Therapy. 2007;12:80-3
37. Aina A, May S. Case report: A shoulder derangement. Manual Therapy. 2005;10:159-63

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