

Evaluation of treatment outcomes of combined single session Arthrocentesis and Dextrose Prolotherapy for the treatment of Temporomandibular Joint Disorders

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Citation of this Article: Dr. Sameer Choudhari, Dr. Neelkant Warad, Dr. Maruti, Dr. G. Suchitra, Dr. Kiran Kumar, Dr. Sameena Shaikh, “Evaluation of treatment outcomes of combined single session Arthrocentesis and Dextrose Prolotherapy for the treatment of Temporomandibular Joint Disorders”, IJDSIR- March - 2022, Vol. – 5, Issue - 2, P. No. 45 – 54.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Temporomandibular disease is a term used to describe group of medical disorders causing joint pain and dysfunction. The treatment approach for this is also varied depending upon the underlying cause. Alternative therapies prior to surgical exploration are also commonly employed. Arthrocentesis and Prolotherapy being minimally invasive surgical therapies

have gained lot of importance. A combination of these therapies in a single session has also been advocated.

Aims and Objective: To evaluate the efficacy of arthrocentesis and prolotherapy in patients with temporomandibular joint dysfunction in relieving pain, subluxation, clicking sound and improving the mouth opening with the objective of establishing normal function.

Materials and methods: A total of 30 patients with disc displacement and painful, hyper mobile joint were selected. Informed consent was taken. Arthrocentesis and prolotherapy was performed consecutively using 30% dextrose solution injected into five areas namely posterior disc attachment, superior joint space, superior and inferior capsular attachments, and stylomandibular ligament. Patients with rheumatoid arthritis and parafunctional habits such as teeth clenching, grinding, biting of the cheeks or any other objects and those who had undergone surgery were excluded from this study. Patients underwent regular follow up post operatively at 1st week, 1month, 3 month and 6month period intervals for evaluating the maximum mouth opening, pain, subluxation and clicking sound.

Statistical analysis: Paired t-test and Chi-square test was employed.

Results: A total of 30 participants (34.20 ±7.06 years old, 19 women and 11 men) received a single treatment session of combined arthrocentesis and prolotherapy. Subluxation frequency and pain significantly decreased after the first week of treatment ($p < 0.01$). It even decreased at the 3-month and 6 months follow-up ($p < 0.01$). Clicking sound values significantly decreased at all follow-ups. Maximum mouth opening values decreased at all follow-up time points compared to baseline ($p < 0.01$).

Conclusion: A single session of combined arthrocentesis and prolotherapy to treat symptomatic temporomandibular joint disorders safely and significantly improved the condition of the disease.

Keywords: Arthrocentesis, Dextrose, Prolotherapy, Subluxation, Tempromandibular joint diseases.

Introduction

Temporomandibular joint (TMJ) is a complex synovial joint with upper and lower compartments comprising of

temporal bone, mandibular bone, articular disc, synovial membrane with associated ligaments and bone.^[1] Temporomandibular diseases (TMD) are collection of medical and dental conditions affecting the joint and muscles of mastication, as well as contiguous tissue components.^[1] Symptoms commonly associated with TMD include pain at the TMJ, generalized orofacial pain, chronic headaches and earaches, jaw dysfunction including hyper- and hypo-mobility and limited movement or locking of the jaw, painful clicking or popping sounds with opening or closing of the mouth and difficulty in chewing and speaking.^[2] Cardinal signs of TMD may be limitation of mandibular movement, pain with mandibular function, joint sounds, restricted jaw movement, irregular jaw movement and TMJ sounds such as clicking, popping, or crepitation.^[3]

The treatment modality depends on the accurate assessment of the problem, a comprehensive evaluation and diagnosis. Accordingly, there are two approaches namely surgical and non-surgical. Treatment approaches include intermaxillary fixation, intra capsular injection of sclerosing solutions (alcohol), intra-muscular injection of botulinum toxin, intra-articular injections of autologous blood, and arthrocentesis and prolotherapy.^[4] Other surgical approaches included are capsular plication, condylectomy, eminectomy, discectomy and augmentation of the articular eminence.^[4] Surgical disadvantages include ligament injury, nerve injury, chances of re-ankylosis, occlusal difficulties recurrent pain and dysfunction.^[4] The treatment for pain and displacement of the TMJD can be long and tiring because of the involvement of the joints as well as the surrounding tissues and muscles, which must also be treated. Consecutively, performing arthrocentesis and prolotherapy may be an effective method to shorten the duration of treatment.^[5]

Arthrocentesis of the TMJ, a minimally invasive surgical technique was first described by D. W. Nitzan in the year 1991. It involves irrigation of the superior joint space with Ringer Lactate Solution. Lavage of the superior joint space reduces the inflammatory mediators. Therefore, arthrocentesis is also used to reduce pain. Furthermore, arthrocentesis promotes disc repair/repositioning in temporomandibular articular disorders. [5]

Prolotherapy, which is known as regenerative injection therapy and growth factor stimulation injection therapy, is used to strengthen and repair chronic ligament joint capsule and tendinous injuries by stimulating proliferation of collagen at the fibro-osseous junctions to promote soft tissue repair and relieve pain. [4]

Prolotherapy as a treatment for TMJ hyper mobility was first reported by Louis Schults in 1937, as a simple method of shortening and strengthening the TMJ capsule. Although different agents such as Phenol-Glucose-Glycerin and Sodium morrhuate were used in prolotherapy, dextrose in varied concentrations of 10% to 50% is the most common prolife rant used because of its safe nature. [4]

Aims & Objectives

This study was done mainly to evaluate the treatment outcomes of combined Arthrocentesis and Prolotherapy in treating Temperomandibular joint disorders.

Study design

A total of 30 patients with TMJ diseases were selected after taking informed consent and ethical committee clearance and the patients were followed for a period of 6 months.

Inclusion criteria

1. History of sudden limitation of jaw movements, irregular jaw movements.

2. Presence of painful subluxation or dislocation of TMJ.
3. History of Open locking
4. Patient complaining of joint sounds such as clicking, popping or crepitating and facial pain.
5. Deviation of jaw on opening and protrusive movements
6. Impeded lateral movements of jaw.
7. Exacerbated pain or pressure in the TMJ
8. TMJ hypermobility.

Exclusion criteria

1. Presence of other disorders involving the TMJ like myalgia, degenerative joint disease, collagen vascular disease.
2. History of major jaw trauma
3. Dentofacial deformity
4. Psychiatric illness
5. Chronic headache
6. Patients with history of fibrous and bony adhesion
7. Patients below 18 years
8. Patients with corn allergy
9. Presence of medical conditions that may interfere with healing
10. Neurological disorders and allergic to anesthetic or prolife rant solutions

The surgical procedure for arthrocentesis involved the following steps. Pre operative mouth opening was measured and the surgical field draped and painted with povidone iodine [Fig 1]. A cantho-tragal line was drawn from the outer canthus of ipsilateral eye to midpoint of tragus. A point approximating the posterior extent of the articular fossa was marked 10 mm anterior to the midtragal point and 5 mm inferior to canthotragal plane. A second point marked 20 mm anterior to tragus and 10 mm inferior to canthotragal line corresponded to the height of articular eminence [Fig 2]. Auriculotemporal

nerve block with 2% lignocaine and 1:80,000 adrenaline was administered and superior joint space entered at 10-5 point with a 21-gauge needle at antero-medio-lateral direction reaching posterior aspect of articular eminence. A 200ml of Ringer's lactate solution was injected passively into the joint until rebound of syringe with mandibular movement was obtained. A second needle was inserted slightly anterior to first needle at 20-10 point for outflow of irrigant from joint space [Fig 3]. After lavage was performed using approximately 200 ml of Ringer's lactate solution [Fig 4], joint manipulated through opening and closing, protrusive and excursive movements of the mandible.

Procedure for prolotherapy: Once arthrocentesis was performed, 1ml of prepared solution containing 0.5 ml of 30% dextrose and 0.5 ml 2% lignocaine was injected into five areas: posterior disc attachment, superior joint space, superior and inferior capsular attachment and stylomandibular ligament, when the mouth was open [Fig 5]. Post operative mouth opening values were obtained by measuring the distance between the maxillary and mandibular incisors [Fig 6]. Patients were followed up post operatively at 1st week, 1month, 3 month and 6month for evaluating the maximum mouth opening, TMJ pain, subluxation and clicking sound.

Statistical methods used: The calculation for sample size estimation was done by using the formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

where Z= z statistic at 5% level of significance, d is margin of error, p is maximum anticipated prevalence rate of symptomatic temporomandibular joint disease cases. The obtained results were statistically analyzed using Paired t-test and Chi-square test.

Results

Out of 30 selected patients, 11 were men and 19 women, aged between 27-48years (mean age of 34.70 ± 7.06) (Table 1). The mean maximum mouth opening values were 47.33 (-5.29) mm at baseline (before the intervention), 42.03 (-5.44) mm after 1 week, 43.43 (-3.27) mm after 1 month, and 44.06 (-1.52) mm after 3 month and 44.80(-0.88) after 6 months. After evaluating the descriptive analysis, maximum mouth opening values decreased during the 1-week follow-up in all patients. The maximum mouth opening values between 1 week and 1 month increased in all the patients. After 3 months, the maximum mouth opening values were lower than the baseline in all patients (Table 2, Graph 1). The maximum mouth opening values are statistically lower between the baseline and after 1 week ($p < 0.001$), 1 month ($p < 0.001$), 3 months ($p < 0.010$) and 6 months ($p < 0.080$) which are significant (Table 3, Graph 3). Baseline values are more than normal due to TMJ hypermobility.

Subluxation

21 patients out of 30 reported with the complaint of subluxation at baseline and the frequency decreased in 4 patients and it completely disappeared in all 17 patients. Values of subluxation frequency significantly decreased between baseline and 1 week ($p < 0.011$), between baseline and 3 months ($p < 0.001$) and between baseline and 6 months ($p < 0.001$) (Table 3). The degree of TMJ pain experienced by patients before arthrocentesis and prolotherapy was analyzed using visual analogue scale (VAS) as ranging from 0 to 3 (0=no pain,1=mild pain,2=moderate pain and 3=severe pain). The mean pain values were 2.0 (-0.7) at baseline, 1.1 (-0.3) after 1 week, 0.7 (-0.8) after 1 month, 0.2 (-0.5) after 3 months, and 0.1 (-0.3) after 6 months [Table 4]. Pain decreased in 28 patients. However, it did not completely disappear in

two patients. All the values were statistically significant between regular intervals of time. Clicking sounds were observed at the baseline in 22 patients, and no sounds were observed in 8 patients. At first week visit sounds were observed in 19 patients, and no sounds were observed in 11 patients. At one month of follow up, the sounds were observed in 13 patients. With the third month follow up sounds were observable in 9 patients, and no sounds were observed in 21 patients. At around six months after therapy sounds were absent in 9 patients. Changes from baseline to 6th month were statistically significant ($p < 0.001$) (Table 5, Graph 2).

Discussion

Temperomandibular Joint Disorders may present with cluster of joint and muscle disorders characterized primarily by pain, joint sounds and irregular jaw function.^[6] It has been suggested that classification, diagnosis and treatment of TMJ pain and dysfunction can be based on the position and shape of the articular disc.^[7] Currently, the minimally invasive treatments such as arthrocentesis and prolotherapy are often used as first line of surgical treatment or in conjunction with non-surgical modalities, as they have been shown to be procedures with low morbidity and high efficacy.^[8] Arthrocentesis and prolotherapy are an easy, minimally invasive, and highly efficient procedure to decrease TMJ pain, subluxation, clicking sound and increase the range of mouth opening with TMJ disorders.^[6,9]

In our study mean mouth opening decreased from baseline at all follow ups which is similar to studies conducted by Yeungrwk et al^[10], BurakCezairli et al^[5], Ramesh Reddy et al^[11], Rawand Mustafa et al^[4]. The findings were higher to those of Roy V. Hakala et al^[3] (48mm to 52mm) which could be due to the differences in the use of intra-articular medications used for the treatment. In the study done by Yeungrwk et al^[10]

hyaluronic acid was used for intra-articular injection but we have used Ringer's Lactate solution for lavage and 30% dextrose as a proliferant (Regenerative agent).^[5]

Mean subluxation frequencies also reduced significantly during our case observations which is in correlation with studies by HamidaRepai et al^[12], CemUngor et al^[13], BurakCezairli et al (1.7 to 0.6).^[5]

Regarding the subjective findings following treatment, the degree of pain reduced in all follow ups. These observations are similar to those of Roy V. Hakala et al^[3] (2.8 to 0.0), BurakCezairli et al (1.9 to 0.9).^[5] These findings were higher to those of Nitzan DW et al (9.86 to 3.39)^[14], Yeung RWK et al (4.2 to 2.6)^[10], Ross A. Hasur et al (8.0 to 1).^[15] The probable explanation that could be given due to the variations in the values is the short follow-up period and variations in the post operative medications given. In the present study two needle technique along with injection of 30% dextrose as described by BurakCezairli et al^[5] was used and postoperatively antibiotics and analgesic with muscle relaxants were prescribed for two weeks. Both arthrocentesis and prolotherapy in a single therapeutic session was employed for the treatment purpose. The primary findings are that pain, subluxation frequency, mouth opening and clicking sound outcomes significantly improved after 1 week and that subluxation and maximum mouth opening improved throughout the follow up period of up to 6 months. Jaw clicking improved at all follow-up points. These outcomes suggest a good positive effect as is with the previous studies.^[5,16,17] As other studies have described both positive and negative findings, studies on combination of these two therapies together in a single session and its associated outcomes is limited.

Regarding the rationale of the procedure used in this study, pain in a hypermobile patient is often caused by

stretching of the retro discal tissues during mouth opening. In this study, pain was observed on palpation of the TMJ region, which is often a symptom for intra-articular inflammatory process. To date, studies show that pain and dysfunction are often refractory to care with a single treatment modality. Therefore, arthrocentesis and prolotherapy were consecutively performed to treat pain and disc dislocations and to reduce hypermobility in a single session. Treatment results of the patient group with pain, disc dislocation, and hypermobility symptoms were reported in our study group, but repositioning of the disc was not assessed. In hypermobility, patient's pain was often caused by stretching the retro discal tissues while opening the mouth. Pain was observed on palpation of the TMJ region, which is often a symptom of intra-articular inflammatory process. Treating all these symptoms using one treatment modality was considered insufficient. Therefore, arthrocentesis and prolotherapy were consecutively performed to treat pain and disc dislocations and to reduce hypermobility in a single session. Arthrocentesis was performed in the superior joint space to reduce the concentrations of pro-inflammatory mediators and pain mediators, as well as for disc repair/repositioning. Thereafter, prolotherapy was performed to cause re-inflammation and strengthening of the lax ligaments. Many studies in the literature showed the efficacy of arthrocentesis to reduce pain up to 6 months.^[14]

We observed that combined application of arthrocentesis and prolotherapy significantly reduced joint pain at first week. Although the pain values were lower after 3 months and 6 months, the results were statistically significant and the long-term result was caused by the presence of hypermobility. The results of applying any

single or multiple sessions with a large sample size remain unknown.

Results related to prolotherapy vary in the literature. Successful outcomes of different clinical symptoms are consistent in few studies^[18, 12] Furthermore, Kilicet et al.^[19] claimed that prolotherapy and placebo treatment have the same efficacy in treating any of the outcome variables of TMJ hypermobility. Improvement in clicking sound,^[3,16,19] alleviation of pain^[3,20,21,19] improvement in maximum mouth opening,^[16,19] and decreased subluxation frequency,^[20,16,17] have been observed which is similar to the present study. Histological studies^[22] also suggest that the treatment with prolotherapy had progressive non-inflammatory sub-synovial connective tissue fibrosis, with vascular proliferation and thickening of collagen bundles. Tissue fibrosis stabilizes the joint and prevents the increase of mouth opening in a hypermobile joint.^[23]

Recently, prolotherapy has been performed using different concentrations and with local anesthetics and has been described as generally effective.^[17] The potential mechanism of action underlying prolotherapy may be related to the concentration of dextrose which initiates the biologic process of wound healing. After the injury, the granulocytes, monocytes, and macrophages migrate to the injured area. Growth factors are released and they activate fibroblasts, which produce matrix and new collagen fibers.^[3, 16, 17]

Limitations of the study

Performing arthrocentesis and prolotherapy in the same session was regarded as a temporary treatment. The treatment should be performed in three to five sessions to obtain optimal efficacy. If multiple sessions were performed in this study, results would have been better. Therefore, further research on this approach and its long-term success should be conducted.

Conclusion

Arthrocentesis and prolotherapy were performed with the aim to reduce TMJ pain and dysfunction, including hyper mobility. Another goal of this study was to complete the treatment within a short period of time. This approach was successful in the short term. But long-term benefits and increase in the frequency of combined therapy along with larger sample size would be emphasized for obtaining a better outcome.

References

1. Hassan N, Sleem H, Nabil Y. Arthrocentesis with or without Platelet Rich Plasma (PRP) in Management of Temporomandibular Joint Internal Derangement: Comparative Study. *Oral Health Dental Sci.* 2019;3(2):1-8.
2. Hauser RA, Hauser MA, Blakemore KA. Dextrose prolotherapy and pain of chronic TMJ dysfunction. *Practical Pain Management.* 2007; 7 (9):49-57.
3. Hakala RV, Ledermann KM. The use of prolotherapy for temporomandibular joint dysfunction. *J Prolotherapy.* 2010; 2:439.
4. Mustafa R, Güngörmüş M, Mollaoglu N. Evaluation of the efficacy of different concentrations of dextrose prolotherapy in temporomandibular joint hypermobility treatment. *Journal of Craniofacial Surgery.* 2018 Jul 1; 29 (5): e461-5.
5. Cezairli B, Sivrikaya EC, Omezli MM, Ayranci F, Seyhan Cezairli N. Results of combined, single-session arthrocentesis and dextrose prolotherapy for symptomatic temporomandibular joint syndrome: a case series. *The Journal of Alternative and Complementary Medicine.* 2017 Oct 1; 23 (10):771-7.
6. Emshoff R, Kranewitter R, Gerhard S, Norer B, Hell B. Effect of segmental Le Fort I osteotomy on maxillary tooth type-related pulpal blood-flow characteristics. *Oral Surgery, Oral Medicine, Oral*

Pathology, Oral Radiology, and Endodontology. 2000 Jun 1;89(6):749-52.

7. Kunjur J, Anand R, Brennan PA, Ilankovan V. An audit of 405 temporomandibular joint arthrocentesis with intra-articular morphine infusion. *British Journal of Oral and Maxillofacial Surgery.* 2003 Feb 1; 41 (1):29-31.
8. Lee SH, Yoon HJ. MRI findings of patients with temporomandibular joint internal derangement: before and after performance of arthrocentesis and stabilization splint. *Journal of oral and maxillofacial surgery.* 2009 Feb 1; 67(2):314-7.
9. Yura S, Totsuka Y, Yoshikawa T, Inoue N. Can arthrocentesis release intracapsular adhesions? Arthroscopic findings before and after irrigation under sufficient hydraulic pressure. *Journal of Oral and Maxillofacial Surgery.* 2003 Nov 1;61(11):1253-6.
10. Yeung RW, Chow RL, Samman N, Chiu K. Short-term therapeutic outcome of intra-articular high molecular weight hyaluronic acid injection for nonreducing disc displacement of the temporomandibular joint. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology.* 2006 Oct 1;102(4):453-61.
11. Reddy R, Reddy VS, Reddy S, Reddy S. Arthrocentesis-A minimally invasive treatment of temporomandibular joint dysfunction: Our experience. *Journal of Dr. NTR University of Health Sciences.* 2013 Jul 1;2(3):196.
12. Ungor C, Atasoy KT, Taskesen F, Cezairli B, Dayisoğlu EH, Tosun E, Senel FC. Short-term results of prolotherapy in the management of temporomandibular joint dislocation. *Journal of Craniofacial Surgery.* 2013 Mar 1;24(2):411-5.
13. De Riu G, Stimolo M, Meloni SM, Soma D, Pisano M, Sembronio S, Tullio A. Arthrocentesis and temporomandibular joint disorders: clinical and

radiological results of a prospective study. *International journal of dentistry*. 2013 Jan 1;2013.

14. Nitzan DW, Svidovsky J, Zini A, Zadik Y. Effect of arthrocentesis on symptomatic osteoarthritis of the temporomandibular joint and analysis of the effect of preoperative clinical and radiologic features. *Journal of Oral and Maxillofacial Surgery*. 2017 Feb 1;75(2):260-7.

15. Monje-Gil F, Nitzan D, González-García R. Temporomandibular joint arthrocentesis. Review of the literature. *Medicina oral, patologia oral y cirugiabucal*. 2012 Jul;17(4): e575.

16. Refai H, Altahhan O, Elsharkawy R. The efficacy of dextrose prolotherapy for temporomandibular joint hypermobility: a preliminary prospective, randomized, double-blind, placebo-controlled clinical trial. *Journal of Oral and Maxillofacial Surgery*. 2011 Dec 1;69(12):2962-70.

17. Zhou H, Hu K, Ding Y. Modified dextrose prolotherapy for recurrent temporomandibular joint dislocation. *British Journal of Oral and Maxillofacial Surgery*. 2014 Jan 1;52(1):63-6.

18. Klein RG, Eek BC, DeLong WB, Mooney V. A randomized double-blind trial of dextrose-glycerine-phenol injections for chronic, low back pain. *Journal of Spinal Disorders*. 1993 Feb;6(1):23-33.

19. Kiliç SC. Does injection of corticosteroid after arthrocentesis improve outcomes of temporomandibular joint osteoarthritis? A randomized clinical trial. *Journal of Oral and Maxillofacial Surgery*. 2016 Nov 1;74(11):2151-8.

20. Sidebottom AJ. Current thinking in temporomandibular joint management. *British Journal of Oral and Maxillofacial Surgery*. 2009 Mar 1;47(2):91-4.

21. Rabago D, Slattengren A, Zgierska A. Prolotherapy in primary care practice. *Primary Care: Clinics in Office Practice*. 2010 Mar 1;37(1):65-80.

22. Oh S, Ettema AM, Zhao C, Zobitz ME, An KN, Amadio PC, Wold LE. Dextrose-induced sub synovial connective tissue fibrosis in the rabbit carpal tunnel: A potential model to study carpal tunnel syndrome? *Hand*. 2008 Mar;3(1):34-40.

23. Yoshii Y, Zhao C, Schmelzer JD, Low PA, An KN, Amadio PC. The effects of hypertonic dextrose injection on connective tissue and nerve conduction through the rabbit carpal tunnel. *Archives of physical medicine and rehabilitation*. 2009 Feb 1;90(2):333-9.

Legends Figure and Table

Fig. 1: Showing pre-operative mouth opening measurement



Fig. 2: Showing the markings for surgical procedure



Fig. 3: depicting the two needles in position



Fig. 4: showing irrigation of the joint



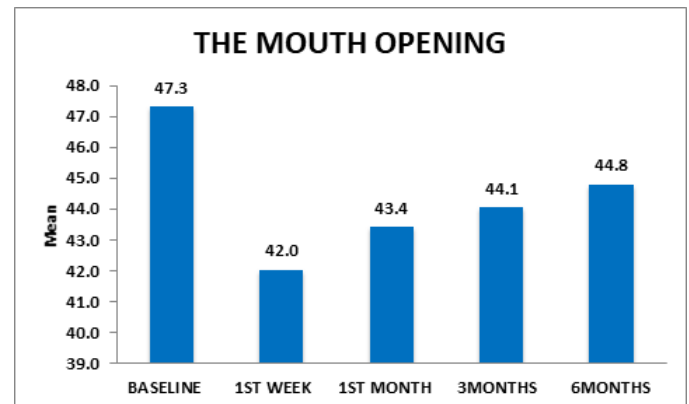
Fig. 5: showing prolotherapy procedure.



Fig. 6: showing post-operative mouth opening measurement.



Graph 1: Mean Mouth Opening according to follow-up.



Graph 2: Clicking Sound according to follow-up.

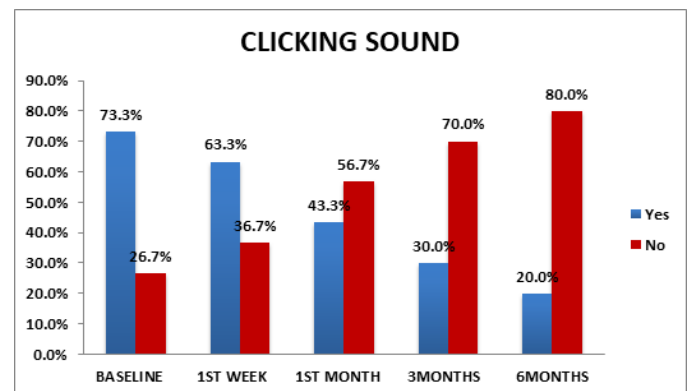


Table 1: Distribution of Cases according to Age and gender.

Age	No of	%	Gender	No	of	%
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(yrs.)	patients			patients	
26-30	6	20	Male	11	36.7
31-35	9	30	female	19	63.3
36-40	8	26.7			
41-45	3	10			
46-50	4	13.3			
Total	30	100		30	100

Table 2: Mean Mouth Opening according to follow-up.

Follow-up	Mouth opening (mm)		p-value compared to Baseline
	Mean	SD	
Baseline	47.3	5.3	-
1st week	42.0	5.4	<0.001*
1st month	43.4	3.3	0.001*
3months	44.1	1.7	0.010*
6months	44.8	0.9	0.080

Note: * significant at 5% level of significance (p<0.05)

Table 3: Mean Subluxation according to follow-up.

Follow-up	Subluxation(frequency)		p-value compared to Baseline
	Mean	SD	
Baseline	2.1	1.6	-
1st week	1.4	1.2	<0.001*
1st month	0.6	0.9	<0.001*
3months	0.3	0.4	<0.001*
6months	0.1	0.3	<0.001*

Note: * significant at 5% level of significance (p<0.05)

Table 4: Mean TMJ Pain according to follow-up.

Follow-up	Tmj pain (Visual analogue score)		p-value compared to Baseline
	Mean	SD	
Baseline	2.0	0.7	-
1st week	1.1	0.3	<0.001*
1st month	0.7	0.8	<0.001*
3months	0.2	0.5	<0.001*
6months	0.1	0.3	<0.001*

Note: * significant at 5% level of significance (p<0.05)

Table 5: Clicking Sound according to follow-up.

Follow-up	Clicking sound	p value

	Yes		No		
	N	%	N	%	
Baseline	22	73.3%	8	26.7%	<0.001*
1st week	19	63.3%	11	36.7%	
1st month	13	43.3%	17	56.7%	
3months	9	30.0%	21	70.0%	
6months	6	20.0%	24	80.0%	

Note: * significant at 5% level of significance (p<0.05)