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A COMPARATIVE STUDY BETWEEN CRANIOSACRAL THERAPY AND CONVENTIONAL PHYSIOTHERAPY TREATMENT ON TEMPOROMANDIBULAR JOINT DYSFUNCTION.

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ABSTRACT **Background and objective:** The temporomandibular joint (TMJ) is a unique synovial joint, consisting of the articular disc, mandibular fossa of the temporal bone, condyle of the mandible, fibrous capsule, synovial fluid, and ligaments. It is located below the posterior end of the zygomatic arch and in front of the external acoustic meatus. In TMJ there are many types of dysfunction are present like pain, inflammation, swelling, unable to open & closing of mouth or limitation in a jaw movement, clicking sounds. TMJ is having several movements like mandible elevation, depression, protrusion & retrusion. 15% of adults and 7% of adolescents have been reported to have TMJ dysfunction and previous research studies including our study showed that females are more affected with TMJ dysfunction than the males. TMJ dysfunction is associated with age, gender, usage of TMJ, poor cervical posture which will contribute to the symptoms. Many studies have been done to determine the effective treatment for temporomandibular joint dysfunction. Previous studies showed the effectiveness of ultrasound and strengthening exercises on TMJ dysfunction. CST is a another modern form of non invasive hands on technique which will work by cerebrospinal fluid flow to decrease pain & dysfunction. The aim of the study is to evaluate the effect of ultrasound along with isometric exercise and strengthening exercise verses CST with isometric exercises and strengthening exercises and secondly comparing the effectiveness of CST along with the isometric exercises and strengthening exercise verses ultrasound therapy along with the isometric exercises and strengthening exercise which was evaluated by VAS scale & neck disability index scale. **Material & methods-** In this comparative study 40 patients were taken who were suffering from TMJ dysfunction & they were allocated in two groups randomly group A and group B . Group A was a experimental group who received CST for 2 consecutive week 6 session per week followed by isometric & strengthening exercise for 4 weeks and group B was a control group who received Ultrasound therapy for 2 consecutive weeks continuously 1 session per day followed by isometric & strengthening exercises for 4 weeks. For both the groups outcome measures was measured before & after treatment by using VAS scale & neck disability index scale questionnaire. Our study aimed to investigate the effectiveness of both treatments & compare which is more effective for TMJ dysfunction using VAS scale & neck disability index scale. **Results-** Results have showed that there is a significant difference was observed between of pre-test and post-test scores of pain (VAS) in Group A. There was a significant difference was observed between pre-test and post-test scores of pain (VAS) in Group B but in the Group B it is showing slight higher changes as compared to Group A in pain (VAS) scores. Also there is a significant difference was observed between pre-test and post-test scores of Neck disability index in both the Group A & Group B. But Group B had showed slight higher changes as compared to Group A in Neck disability index scores statistically. Both the treatment is effective in the treatment of temporomandibular joint dysfunction, Hence both the treatment we can recommend for the patients who were having symptoms of temporomandibular joint dysfunction. **Conclusion-** TMJ dysfunction is associated with age, gender, usage of TMJ ,poor head & cervical posture which will contribute to the symptoms. In both the groups A and group B Post treatment results showed the significant improvement in all the parameters Both the treatment statistically showed effectiveness in reducing symptoms in temporomandibular joint dysfunction and showed similar effects in both A & B groups. Both the treatment can be recommended to treat patients who were having symptoms of temporomandibular joint dysfunction. But Group B statistically showed slight higher changes as compared to Group A in Neck disability index scores and VAS scale when assessed post treatment.

KEYWORDS : Temporomandibular joint dysfunction, Craniosacral therapy, Ultrasound, Strengthening exercises, VAS scale, Neck Disability Index Scale.

INTRODUCTION-

The temporomandibular joint (TMJ) is a unique synovial joint, consisting of the articular disc, mandibular fossa of the temporal bone, condyle of the mandible, fibrous capsule, synovial fluid, and ligaments. It is located below the posterior end of the zygomatic arch and in front of the external acoustic meatus. Different mandibular movements are there such as mandibular elevation, mandibular depression, protrusion, retrusion, and lateral excursions are carried out by the TMJ. It withstands various forces for mastication, deglutition, and phonation . Temporomandibular dysfunction (TMJ) is a indefinite term that accompanies various clinical conditions with or without relationship of the cervical spine[1]. In the world, over 450 million people had chronic facial pain of which 6% were men and 10% were women. The incidence increases with age, especially after the age of 40 years[1]. TMJ can have degeneration which is not necessary related to aging process it can be because of pre existing dysfunction. TMJ can have inflammatory conditions like capsulitis & synovitis . Capsulitis is defined as inflammation of a joint capsule & synovitis is characterised by fluctuating oedema caused by effusion with synovial membrane. Temporomandibular joint also affected by Capsular Fibrosis where there is a restriction of the movement due to intracapsular fibrous adhesions, Capsular fibrosis is characterized by a mandibular opening of less than 40 mm (commonly less than 25 mm) because of adhesions that limit extensibility of the TMJ capsule. Stiesch-Scholz investigated the incidence of cervical spine dysfunctions in patients with temporomandibular disorders (TMDs). The results demonstrated a bigger restriction in cervical rotation, cervical flexion and extension, Hypomobility at the level of the joint facets and suboccipital area, and muscular sensitivity at the cervical level, dorsal level, and shoulder area. In prolonged cervical flexion posture associated with stress, the mandibular condyle is pushed back against the meniscal tissue, causing inflammation, pain, and its progressive degeneration[1]. TMJs and afferent muscles are innervated by the trigeminal nerve. Therefore, the pain in TMD act as a referred headache[1]. Osteoarthritis can also be associated with pain and functional impairment of the TMJ, and is characterized by subchondral bony changes such as cortical erosion and marginal lipping, secondary to pathological changes of the cartilaginous articular disc[2]. The severity of internal derangement has been classified by Wilkes into five stages with relations to pain, mouth opening, disc location[2]. The classification ranges from painless clicking of the joint (Stage I) to severe pain of the joint with severe degenerative bony changes (Stage V) There are few common diagnoses of TMD which are divided into painful conditions (myalgia, local myalgia, myofascial pain, myofascial pain with referral, arthralgia, headache attributed to TMD) and non-painful conditions like (disc displacement with reduction, disc displacement with reduction with intermittent locking, disc displacement without reduction with limited opening, disc displacement without reduction without limited opening, degenerative joint disease, subluxation)[2].

Table 1. Common diagnoses of temporomandibular joint disorders (TMD) and their symptomss.

s.no	Painful Conditions	Clinical signs & symptoms
1	Myalgia	Pain or tenderness of jaw. Pain in one or both of the temporomandibular joints. Aching pain in and around the ear. Difficulty in chewing or pain while chewing. fascial pain. Locking of the joint, making it difficult to open or close your mouth.

2	Local Myalgia	Familiar pain in the masseter or temporalis localized to the site of palpation
3	Myofascial pain with referral	pain and tenderness in and around the masticatory structures like masseter or temporalis or referred to other locations in the head and neck,
4	Arthralgia	Pain in your TMJ, face, ears, or surrounding areas. Discomfort or pain when chewing or speaking. Stiffness when moving your jaw muscles, or a locking jaw. Clicking or popping noises when moving your jaw. Swelling.
5	Headache attributed to TMD	pain in the temple on palpation of the temporalis muscle,& pain modified by jaw movement, function
6	Disc displacement with reduction	clicking/popping and pain with jaw use (such as chewing).
7	Disc displacement with reduction with intermittent locking	It is similar to DDWR with the additional symptom of intermittent limited jaw opening.
8	Disc displacement without reduction with limited opening	Limited mouth opening affecting function, with maximum assisted opening ≤ 30 mm.
9	Disc displacement without reduction without limited opening	Limited mouth opening affecting function, with maximum assisted opening of ≥40mm
10	Degenerative joint disease	shows erosion, flattening, sclerosis, subchondral cysts, and osteophytes. The joint space also decreases as a result of the loss of the joint cartilage tissue & crepitus

Another condition in TMJ is articular disc displacement with or without reduction, mechanical stress is the most common factors in various condition. Usually patient come with the symptoms of jaw pain or dysfunction, swelling & inflammation over cheek bones, earache, headache, and facial pain, joint sounds, limitation in jaw movements while closing & opening of a mouth, clicking sounds during jaw movements, muscles tenderness, related with cervical spine disorders, patients complain of difficulty in chewing, swallowing & poor sleep quality due to pain, if it not treated well it become chronic & thereby leads patients into depression & poor quality of life. If there is overuse in the jaw muscles like from teeth grinding (bruxism), jaw clenching (often stress-related), gum chewing, etc then it will give rise to myofascial pain. Structural pain may be due to a dislocated jaw bone/disc , Facial trauma from a car crash or a punch to the jaw can lead to structural problems[3] . TMD affects up to 15% of adults and 7% of adolescents[4]. Muscle tenderness in the cervical spine and jaw was shown to be associated with increased levels of jaw and neck disability [5]. Evidence suggests that TMD are commonly associated with other conditions of the head and neck region, including cervical spine disorders and headache. Approximately 70% of patients presenting with TMJ disorders also have cervical spine impairments [6,7].

Craniosacral Therapy is a modern non invasive treatment & hands-on technique that focuses on head (cranium), spine, and sacrum (a triangular bone at the base of the spine). Using light pressure, a therapist releases tension in the connective tissue and encourages the flow of cerebrospinal fluid between the cranium, spine, and sacrum . CST is used in the treatment of a variety of diseases/disorders and forms of dysfunction, including, but not limited to, low back pain, headache, temporomandibular dysfunction[8,9]. In this view, the primary respiratory mechanism is comprised of the brain, cerebrospinal fluid, intracranial and intraspinal membranes, cranial bones, spinal cord, and sacrum. The brain is said to produce involuntary, rhythmic movements within the skull[8] . This movement involves dilation and contraction of the ventricles of the brain, which circulate cerebral spinal fluid [8] .This circulatory activity is stated to cause reciprocal tension within the membranes, thus transmitting motion to both the cranial bones and the sacrum[8] .This gentle technique can be used for the treatment of TMD as it allows therapists to access the hard-to-access muscles surrounding the jaw and TMJ, and offers a safe and effective way for a therapist to manually move the joint in order to improve flexibility and range of motion, reduce pain.

CST, or cranial osteopathy, was first described by William G. Sutherland D.O, that it consist of cranial bone movement occurring through a "respiratory mechanism"[10].

A number of studies have investigated the efficacy of physical therapies for TMJ pain. These therapies include massage, electrotherapy, physical and exercise therapies as well as bio-behavioural intervention[11-18]. Physiotherapy is a non invasive method that includes manual therapy, exercises, and physical procedures, which is used in the therapy of TMD and cervical spine. In this study rehabilitation is specifically designed to decrease the signs & symptoms in the TMD which is an essential for pain reduction and improvement of the functions of TMJ and cervical spine and increasing the quality of daily life. Physiotherapy exercise & ultrasound modality and craniosacral therapy are found to be effective in the treatment of temporomandibular joint dysfunction and improving pain, range of motion & functional disability [10-20] .Hence the purpose of this study is to find out the effectiveness of CST along with strengthening exercises for TMJ dysfunction verses effectiveness of ultrasound along with strengthening exercises for TMJ dysfunction . Secondly to compare the effectiveness of CST with the combination of strengthening exercises verses ultrasound with the combination of strengthening exercise by using VAS scale & neck disability index scale. VAS Scale is having sufficient reliability and validity hence it is been used to assess pain. VAS is having good reliability and validity to measure either acute and chronic pain in patients[21,22,23]. Hence in this study VAS scoring has been taken for the measurement of pain pre treatment & post treatment. Neck disability index scale (NDI) is having high degree of reliability & validity for assessing patients with the cervical/neck pain [24-27]. Hence for assessing cervical pain pre treatment and post treatment we used neck disability index scale.

AIMS & OBECTIVES

The main aim of the study is to find out the effectiveness of CST along with strengthening exercises for TMJ dysfunction verses effectiveness of ultrasound along with strengthening exercises for TMJ dysfunction . Secondly to compare the effectiveness of CST with the combination of strengthening exercises verses ultrasound with the combination of strengthening exercise by using VAS scale & neck disability index scale**.**

Need Of The Study-

Temporomandibular joint pain, inflammation, swelling, locking of the mandibular movements are quite common now a days. Many studies had been done to investigate the effective treatment in the reduction of symptoms in patients by using ultrasound therapy and physical therapy exercises . To our knowledge none of the studies had been done to evaluate the effectiveness of CST along with isometric exercise and strengthening exercises verses ultrasound along with the isometric exercises and strengthening exercises in the reduction of symptoms in case of temporomandibular joint dysfunction and secondly to compare the effectiveness of both the treatment in the patients . So our aim is to recognize the effective treatment and to compare the effect of both the treatments for the patients suffering from the temporomandibular joint pain/dysfunction.

MATERIALS & METHODOLOGY

Study Design- comparative study
Study duration- 1year
Sample size- 40 patients

Material Used-

1. Consent form
2. Data collection sheet
3. Visual analogues questionnaire
4. Neck disability index questionnaire scale
5. Ultrasound
6. Treatment table and chair
7. CST table

Inclusion Criteria

1. Both gender- males and females
2. Age between 18years to 55years
3. Pain whether acute, subacute or chronic pain
4. Inflammation , swelling, redness
5. Clicking or crepitus
6. Decreased ROM or difficulty in mouth opening/closing
7. Locking of the jaw with mouth opening or closing of mouth

8. Difficulty with functional activities of the TMJ: chewing, talking, yawning
9. Patient present with cervical pain or headache.
10. Inability to chew, cough, sneeze, swallow or talk without pain

Exclusion Criteria

1. Fracture
2. Surgical history
3. Subjects who are not willing for study.
4. Incomplete Questionnaire filled by participants.
5. Presence of trauma or post trauma
6. Malignancy/cancer
7. Jaw dislocation
8. Congenital disorder
9. Infections
10. Autoimmune disease
11. Dental procedures
12. Unstable joint
13. Neurological disorder
14. Pregnancy

Procedure Methodology:

40 Patients were taken for the study purpose, both males and females who were having age between 18years to 55years, they all were selected for the study purpose, who came to opd and personally to therapists. They all were contacted for study purpose. There were 24 females & 16 males. All the participants were divided into 2 groups. They allwere having symptoms of TMJ dysfunction in which patients were having pain, inflammation, swelling and unable to open and close their mouth and cervical pain. Some were having pain during chewing food. Some complaint of occasionally locking of the jaw while opening and closing of the mouth. Some patients complaint of clicking sounds while jaw closing & opening. All the patients who met with the inclusion criteria and exclusion criteria were taken for the study purpose and they were explained about the purpose of study and were requested to participate in the study. If the patients are willing to participate in the study design then their informed written consent were taken from all the patients. Then once the patients given their informed written consent & they were provided the general demographic data collection sheet which contain name, age, gender, occupation, address, dominance, height, weight, BMI, working experience, fitness and activity level of a patients, type of eating habits, type of food intake. Before the treatments, the patients were assessed for detailed history, & examination which includes pain assessment using pain visual analogue scale (VAS), tenderness, Area was examined for any swelling or erythema, inflammation. Palpation of a joint being done while patient is closing and opens their mouth

Mandibular function impairment questionnaire (MFIQ)is used for scoring the mandibular function before the treatment and once treatment is done after the treatment .The MFIQ is an instrument used to assess the patient's perception regarding the orofacial disability 28,30,31.In this the number of items is giving like: The questionnaire has 17 structured questions27,28.Response options/scale: Each item is scored on a five-point ordinal scale, ranging from "no difficulty" (score = 0) to "very much difficulty or impossible without help" (score = 4) 27,28. Jaw Functional Limitation Scale was also taken, for assessing the functional status of the masticatory system , joint tenderness , muscle spasm, inflammation, swelling, erythema, difficulty/pain in swallowing, difficulty or pain in speech, pain on chewing 29-36. Joint range of motion of cervical spine assessed by goniometer, Cervical spine pain is associated with TMJ dysfunction hence neck disability index questionnaire been used to detect neck pain 34,35,, manual muscle testing was done for all cervical spine movements, ROM assessment was done for limitation in opening & closing of mouth and the maximum pain-free inter-incisal distance (IID) 33. In addition, mandibular movement (MM) was assessed by assessing the range of lower jaw movements by using ruler 37 ,jaw clicking was assessed, during opening of the mouth any deviation is present or no. Once assessment and examination is done patients were randomly divided into two groups, group A which is called as experimental group and group B which is called as control group. Both the groups were having 20 participants each and then once it was put up randomly in both the group. In group A experimental group there were 11 females and 9 males. In group B which was a control group there was a 13 females and 7 males. For experiment group Craniosacral therapy was given for consecutive 2 weeks 6 times per week once per day which was followed by physical therapy strengthening exercises. In the exercises we gave isometric exercise & resistance strengthening exercises for mandible depression & elevation and range of motion exercise , strengthening exercises for cervical spine for about 4 weeks along with it posture correction exercises and home exercises program. For mandible depression we asked the patient to Place a thumb under your chin & apply resistance and push your chin downward against it. Continue opening the mouth against moderate force from your thumb, and then hold it open for 5-10 seconds & we have to repeat it for 10 times. Another exercise we asked for mandibular elevation ,here patient has to Open their mouth as wide as possible & comfortably.

Afterwards put index finger between your chin and lower lip while closing your mouth & apply resistance towards down. In control group which was group B, there the patients receive ultrasound one session for 2 consecutive weeks that is 6 session per week once per day pulsed mode in acute case & on continuous mode in the chronic case along with it cryotherapy for acute pain and subacute pain to decrease inflammation, swelling, was given and for chronic moist pack was applied and once after 2weeks as pain subsides to 40% -50% same exercises protocol were started for group B as well. In both group patient receive exercises like isometric exercise, range of motion exercises, resistance strengthening exercise for TMJ & cervical spine , posture correction exercises, home exercises & along with these protocol , advices was given to the patients to avoid chewing gum, avoid foods that are hard to chew, eating soft food, practice good posture, not chewing on the mouth or tongue, avoid Opening of a mouth widely, for TMJ dysfunction. Hence after 3months all the above parameters again were assessed.

RESULTS-

Table 1: Comparison Of Group A And Group B With Gender

Sex	Group A	%	Group B	%	Total	%
Male	9	45.00	7	35.00	16	40.00
Female	11	55.00	13	65.00	24	60.00
Total	20	100.00	20	100.00	40	100.00
Chi-square=0.4170, p=0.5190						

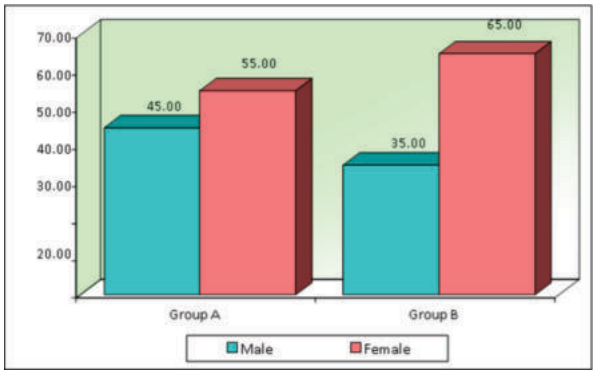

Figure1: Comparison Of Group A And Group B With Gender

Table 2: Comparison Of Group A And Group B With Age Groups

Age groups	Group A	%	Group B	%	Total	%
21-30yrs	5	25.00	3	15.00	8	20.00
31-40yrs	5	25.00	9	45.00	14	35.00
>=41yrs	10	50.00	8	40.00	18	45.00
Total	20	100.00	20	100.00	40	100.00
Mean	38.85		37.65		38.25	
SD	10.34		7.47		8.93	
Chi-square=1.8650, p=0.3940						

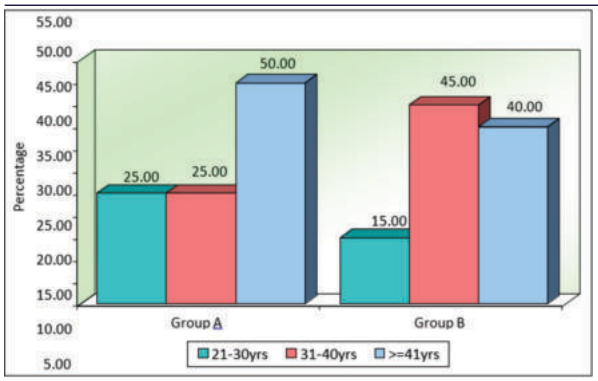

Figure 2: Comparison Of Group A And Group B With Age Groups

Table 3: Normality Of Pretest And Posttest Scores Of Neck Disability Index And Pain Scores In Group A And Group B By Kolmogorov Smirnov Test

Variables	Times	Group A		Group B	
		Z-value	p-value	Z-value	p-value
Neck disability index	Before	0.5470	0.9260	0.4810	0.9750
	After	0.7790	0.5780	0.6300	0.8230
	Difference	0.5250	0.9460	0.8080	0.5310
Pain (vas)	Before	0.9510	0.3270	0.8540	0.4590
	After	0.7180	0.6800	0.7200	0.6780
	Difference	1.7840	0.0030*	1.2690	0.0500

*p<0.05

Table 4: Comparison Of Group A And Group B With Pre-test And Post-test Scores Of Neck Disability Index By Independent T Test

Times	Group A		Group B		t-value	p-value
	Mean	Std.Dev.	Mean	Std.Dev.		
Before	15.60	7.16	15.45	7.06	0.0667	0.9471
After	9.35	4.85	8.95	6.12	0.2292	0.8200
Difference	6.25	2.92	6.50	2.44	-0.2940	0.7703

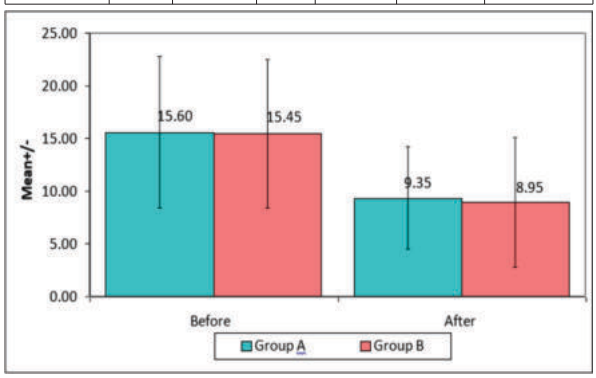

Figure 4: Comparison Of Group A And Group B With Pre-test And Post-test Scores Of Neck Disability Index

Table 5: Comparison Of Pretest And Posttest Scores Of Neck Disability Index In Group A And Group B By Dependent T Test

Groups	Times	Mean	SD	Mean Diff.	SD Diff.	% of change	t-value	p -value
Group A	Before	15.60	7.16	6.25	2.92	40.06	9.5797	0.0001 *
	After	9.35	4.85					
Group B	Before	15.45	7.06	6.50	2.44	42.07	11.9197	0.0001 *
	After	8.95	6.12					

*p<0.05

Table 6: Comparison Of Group A And Group B With Pre-test And Post-test Scores Of Pain (vas) By Mann-whitney U Test

Times	Group A			Group B			U -value	Z--value	p-value
	Mean	SD	Mean rank	Mean	SD	Mean rank			
Before	6.50	1.19	17.35	7.30	1.30	23.65	137.00	-1.6906	0.0909
After	3.30	1.26	19.28	3.65	1.57	21.73	175.50	-0.6492	0.5162
Difference	3.20	0.52	17.03	3.65	0.67	23.98	130.50	-1.8665	0.0620

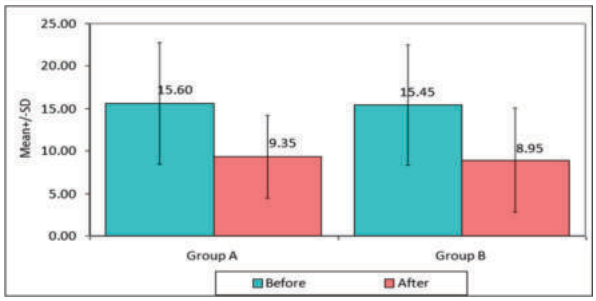

Figure 5: Comparison Of Pretest And Posttest Scores Of Neck Disability Index In Group A And Group B

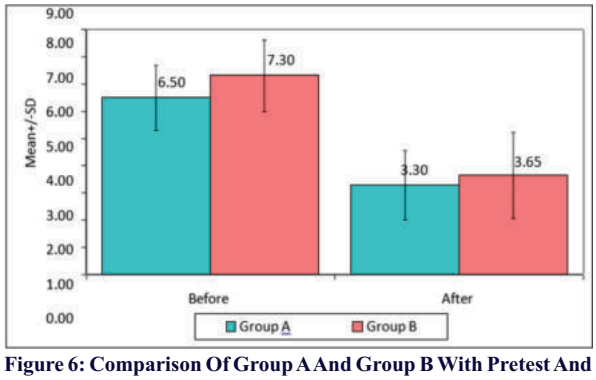

Figure 6: Comparison Of Group A And Group B With Pretest And Posttest Scores Of Pain (vas)

Table 7: Comparison Of Pretest And Posttest Scores Of Pain (vas) In Group A And Group B By Dependent T Test

Groups	Times	Mean	SD	Mean Diff.	SD Diff.	% of change	Z -value	p -value
Group A	Before	6.50	1.19	3.20	0.52	49.23	3.9199	0.0001 *
	After	3.30	1.26					
Group B	Before	7.30	1.30	3.65	0.67	50.00	3.9200	0.0001 *
	After	3.65	1.57					

*p<0.05

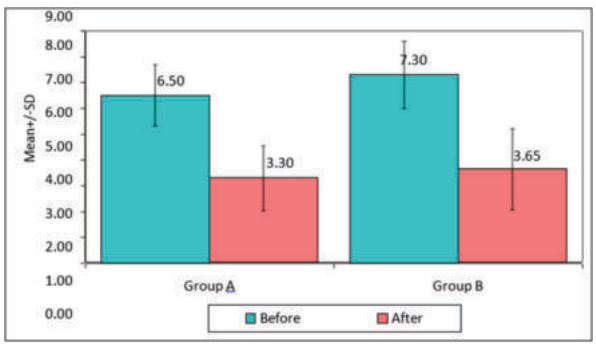

Figure 7: Comparison Of Pre-test And Post-test Scores Of Pain (vas) In Group A And Group B

DISCUSSION

Table 1 explain about the Comparison of Group A and Group B with gender distribution. Table 1 depicts that there is no difference between Group A and Group B with gender distribution (Chi-square=0.4170, p=0.5190).Figure 1 represent the graphical representation of Comparison of Group A and Group B with gender distribution.

Table 2 depicts the Comparison of Group A and Group B with age groups. The table depicts that there is no difference between Group A and Group B with age groups distribution (Chi-square=1.8650, p=0.3940) with mean and SD is 38.85±10.34 for males and 37.65±7.47 for females. Figure 2 shows the graphical representation of comparison of group A and group B with the age groups.

Table 3 explain about the Normality of pre-test and post-test scores of Neck disability index and pain scores in Group A and Group B by Kolmogorov Smirnov test this table depicts that, the pre-test and post-test scores of Neck disability index follow normal distribution. Therefore, the parametric tests were applied. But the pre-test and post-test scores of pain (VAS) follow not normal distribution. Therefore, the no parametric tests were applied.

Table 4 shows the Comparison of Group A and Group B with pre-test and post-test scores of Neck disability index by independent t test this table depicts that there is no significant difference was observed between Group A and Group B with pre-test scores of Neck disability index (t=0.0667, p=0.9471), post-test scores of Neck disability index (t=0.2292, p=0.8200). Also no significant difference was observed between Group A and Group B with changes in scores of Neck disability index from pre-test to post-test (t=-0.2940, p=0.7703). Figure 4 depicts the graphical representation of Comparison of Group A and Group B with pre-test and post-test scores of Neck disability index scale.

Table no 5 shows Comparison of pre-test and post-test scores of Neck disability index in Group A and Group B by dependent t test this table depicts that there is a significant difference was observed between of pre-test and post-test scores of Neck disability index in Group A (t=9.5797, p=0.0001). It means that, a significant of 40.06% changes was seen in Neck disability index scores after post-test in Group A. Also there is a significant difference was observed between of pre-test and post-test scores of Neck disability index in Group B (t=11.9197, p=0.0001). It means that, a significant of 42.07% changes was seen in Neck disability index scores after post-test in Group B. We can concluded that, the Group B is showing slight higher changes as compared to Group A in Neck disability index scores. Figure 5 depicts the graphical representation of Comparison of pre-test and post-test scores of Neck disability index in Group A and Group B

Table no 6 shows the comparison of group A and group B with pre-test and post test score of pain by VAS by Mann- Whitney U test according to the table it shows that there is no such significant difference was observed between Group A and Group B with pre-test scores of pain (VAS) (Z=-1.6906, p=0.0909), post-test scores of pain (VAS) (Z=-0.6492, p=0.5162). Also no significant difference was observed between Group A and Group B with changes in scores of pain (VAS) from pre-test to post-test (Z=-1.8665, p=0.0620). Figure 6 depicts the graphical representation of the Comparison of Group A and Group B with pre-test and post-test scores of pain VAS

Table no 7 explain the comparison of pre-test and post-test scores of pain by using VAS in group A and group B by dependent t test. Here the table depicts that there is a significant difference was observed between of pre-test and post-test scores of pain (VAS) in Group A (Z=3.9199, p=0.0001). It means that, a significant of 49.23% changes was seen in pain (VAS) scores after post-test in Group A. Also there is a significant difference was observed between of pre-test and post-test scores of pain (VAS) in Group B (Z=3.9200, p=0.0001). It means that, a significant of 50.00% changes was seen in pain (VAS) scores after post-test in Group B. We can concluded that, the Group B is showing slight higher changes as compared to Group A in pain (VAS) scores. Figure 7 shows the graphical representation of Comparison of pre test and post test scores of pain (VAS) in Group A and Group B.

CONCLUSION

With this study we concluded that In both the groups A and B Post treatment results showed the significant improvement in all the parameters Both the treatment statistically showed effectiveness in reducing symptoms in temporomandibular joint dysfunction and both the group A and group B showed similar effects. Both the treatment can be recommended for the treatment in patients suffering with temporomandibular joint pain or dysfunction, as symptoms have been decreased in both the groups. But Group B showed statistically slight higher changes with few percentage as compared to Group A in Neck disability index scores and VAS questionnaire scoring when assessed post treatment.

Abbreviations-

CST- Craniosacral therapy
US- Ultrasound therapy
TMJ- Temporomandibular joint
VAS- Visual analogue scale
NDI- Neck disability index scale
MFIQ- Mandibular functional impairment questionnaire
BMI- Body mass index
MM- Mandibular movement
IID- Interincisal distance
DDWR- Disc displacement with reduction

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