e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(8); 1684-1690

Original Research Article

Effect of Dry Needling Over Trigger Point Release for Masticatory Myofacial Pain: A Comparative Study

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Received: 10-02-2023 / Revised: 03-03-2023 / Accepted: 27-04-2023
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Conflict of interest: Nil

Abstract:

Introduction: Masticatory Myofascial Pain (MMP) is a prevalent, chronic orofacial disorder causing pain in the jaw and facial muscles. It considerably impacts patients' quality of life due to its key role in eating and speaking. The complex nature of MMP necessitates comprehensive treatment, including emerging techniques like Dry Needling and Trigger Point Release.

Objective: The study aims to compare and assess the effect of dry needling versus trigger point release for masticatory myofascial pain.

Methods: Two intervention groups were treated with dry needling and trigger point release. The outcome measures were based on the Numeric Pain Rating Scale (NPRS), Maximal Mouth Opening (MMO), and Temporomandibular Disability Index (TMD).

Results: Both groups showed significant improvement in all outcome measures, with dry needling showing superior outcomes. Pre and post-test scores demonstrated a notable difference for both intervention methods. For NPRS, the p-values were <0.2761 (pre-test) and 0.0018 (post-test). Similarly, MMO scores had p-values of 0.2275 (pre-test) and <0.0003 (post-test). Conversely, TMD scores had p-values of 0.9289 (pre-test) and <0.0002 (post-test). Effect Size: The effect size between Group-A and B for NPRS, MMO, and TMD scores was -1.42, -0.38, and -1.63, respectively, indicating a significant difference in the treatment effect.

Conclusion: The study results indicate that dry needling more effectively alleviated masticatory myofascial pain and improved patient outcomes. Further studies are encouraged to confirm these observed effects through controlled, randomized trials.

Keywords: Masticatory, Myofacial, Needling, Trigger.

Introduction

Masticatory Myofascial Pain (MMP) constitutes a significant proportion of chronic orofacial pain disorders, affecting up to 95% of individuals experiencing chronic pain [1]. Often a result of stress, age, gender, and various psychological factors, this pain is typically associated with myofascial trigger points (MTrP), which are hyperirritable spots within taut bands of skeletal muscle fibres [2-9]. These points can produce either local or referred pain and are detectable by palpation[10-12]. MMP constitutes a major clinical puzzle needing exploration, and managing MTrP is considered an essential part of addressing such pain [13-19]. Two prevalent treatment strategies include dry needling and trigger point release. However, a direct comparison of these two method's effectiveness in managing MMP is mainly absent from the literature[20-27]. This paper aims to examine the comparative effects of dry needling and trigger point release on MMP, providing insights into their relative effectiveness and applicability in clinical practice [28-30].

Need for study

Many individuals suffering from myofascial pain often mistake it for a dental issue and seek treatment from dentists. Typically, dentists provide pain alleviation through muscle relaxants and painkillers, but this relief is often short-lived, and the discomfort soon resurfaces. The trigger point release method has become a popular and proven effective strategy to manage masticatory myofascial pain. Nonetheless, the use of dry needling for masticatory muscles is relatively unstudied. Both trigger point

release and dry needling are employed in treating masticatory myofascial pain, raising the question of which practice ultimately has superior efficiency. Consequently, this study aims to ascertain if dry needling can yield superior results compared to the trigger point release method.

Objective:

This research aims to investigate the effectiveness of Dry Needling compared to Trigger Point release for alleviating masticatory myofascial pain. Research Hypothesis: Dry Needling will be more efficacious in managing masticatory myofascial pain than Trigger Point release. Null Hypothesis: Dry Needling will not demonstrate superior effectiveness over Trigger Point release in treating masticatory myofascial pain.

Materials and Methods:

Research Study Design and Setting:

This study employed a Pre and Post-Experimental Comparative Study Design methodology. It was conducted in the Department of PMR SKIMS Soura. Data Collection Methods: Individuals with masticatory myofascial pain were the target population. Inclusion in the study was based on specific criteria, including a palpable taut band or hyperirritable nodule in any of the masticatory muscles and moderate limitation in mandibular movement that has persisted for over a month. Exclusion criteria included disc displacement of TMJ and trigeminal neuralgia and a history of Orofacial surgeries. A convenient sampling method with random allocation was used to select 30 subjects for the study, which had ethical approval from the relevant committee. Pre-intervention assessments were carried out, and baseline data was collected. Procedures: The subjects were divided into two groups. Group A underwent dry needling followed by stretching of the masticatory muscles, while Group B underwent trigger point release followed by stretching. Both groups were educated on postural correction. Each participant underwent a total of 3 treatment sessions per week over two weeks. Interventional Procedures: In Group A, the dry needling procedure used sterilized copper head sterile stainless steel needles of varying lengths according to muscle requirements. In Group B, myofascial trigger release was performed. Post-intervention, both groups received stretching. Materials required: The study required needles of various sizes, alcohol swabs, gloves, a scale for measurements, and stationery items for record keeping.

Outcome measures:

The outcome measures were the TMJ movements were tracked with Maximal mouth opening (MMO)[31][32][33][34], the Numeric Pain Rating Scale (NPRS)[35] was used for pain intensity, and the Temporo-mandibular Disability Index (TMD)[36] was used to measure disability.

Statistical analysis:

IBM SPSS Statistics for Windows, Version 20.0, was used to conduct the analysis (Armonk, NY: 205 IBM Corp). The baseline measures and sociodemographic and clinical characteristics were analyzed using chi-square test, ANOVA and independent sample t-test. The Shapiro Wilk test ($p > 0.05$) 207 and a visual examination of their histograms, normal box plots were used for scores obtained from the NPRS, MMO and TMDI in both the experimental and control groups. A 2 (condition) X 2 (time) repeated measures ANOVA to measure the changes within the group and T-Test to see the difference between the two groups at baseline, Pre-intervention and two weeks post-intervention. The significance level for the statistical tests was set at $p < 0.05$ with 95%.

Results:

The baseline characteristic of the highest population in both groups showed statistically significant differences between the groups for any of the variables. The mean age of Group A was 34.6±13.82 years, and the mean age of Group B was 33.13±10.69 years, with p value of 0.73. Males were more common in both Group A (83.3%) and Group B (76.7%) groups. The patients' educational status varied from no education to post-graduation level in both groups.

Pain scores for Group A significantly decreased after the test. This group's pre-test mean and SD were 8.133±1.12, which reduced to 0.33±0.61 in the post-test. This change was deemed significant with a t-value of 27.91 and p-value <0.0001, indicating a significant difference in Group A's pre-test and post-test pain scores. Similarly, there was a notable difference in the pre and post-test scores for Group B. The pre-test mean and SD were 7.76±1.17, while for the post-test, it was 2.27±2.20. A significant difference was determined as the t-value was 12.13 with a p-value <0.0001, denoting substantial variance in Group B's pre and post-test pain scores.

Table 1: Comparison of group A and group B with respect to Pain scores by unpaired t-test

Variable	Group	N	Mean	SD	t-value	p-value
Pre-test Pain Score	Group A	15	8.13	1.13	1.11	0.2761
	Group B	15	7.66	1.18		
Post-test Pain Score	Group A	15	0.33	0.62	3.42	0.0018
	Group B	15	2.26	2.08		

*p<0.05

The mean and standard deviation (SD) of pre-test pain scores for both Group A and Group B, depicted in Table 2, were assessed, resulting in a t-value of 1.11 and a p-value of <0.2761. This analysis indicates that there was no significant difference in pre-test pain scores between these two groups. However, the examination of the post-test mean and SD of pain scores, also for Group A and Group B as shown in Table 2, yielded a t-value of 3.24 and a p-value of 0.0008. This suggests a significant difference in post-test pain scores between the two groups.

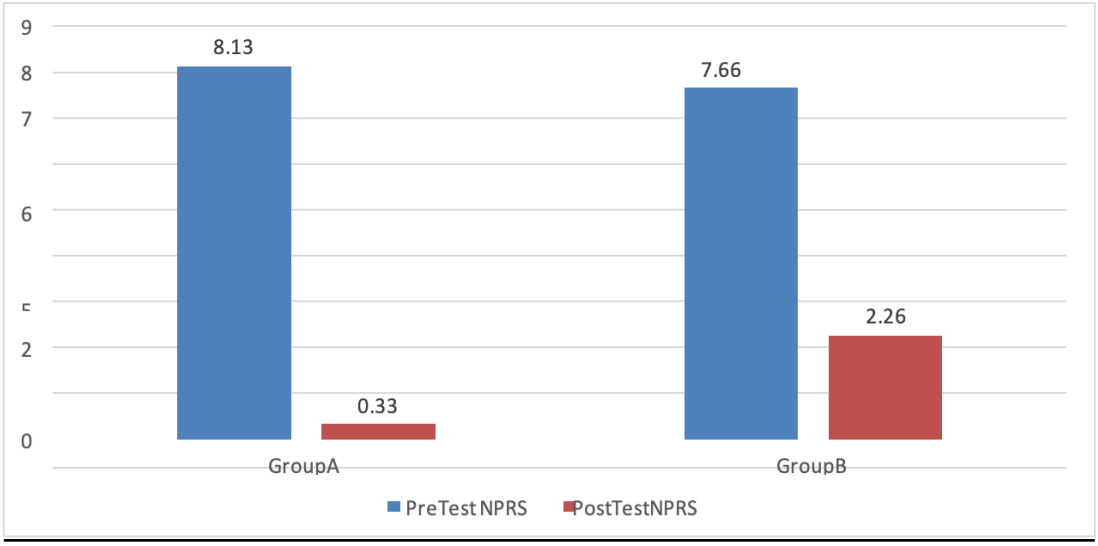

Figure 1: Comparison of pretest and post test NPRS scores in Group A and Group B

The pre-test and post-test scores of Maximum Mouth Opening (MMO) of Group A. The recorded pre-test mean and standard deviation (SD) were 28.40+7.25, while the post-test measurements were 36+4.17 with a t-value of 4.92 at a significant level of p=<0.0001. This demonstrates a substantial statistical difference in Group A's pre-test and post-test values. Likewise, Table 4 also presents a comparison of Group B's pre-test and post-test pain scores. The observed mean and SD of the pre-test were 31.73+7.5. The post-test figures stand at 37.73+4.83, along with a t-value of 3.4 at a significant level of p=<0.0004. This points to a significant statistical variation between Group B's pre and post-test values.

Table 2: Comparison of group A and group B with respect to MMO scores by unpaired t-test

Variable	Group	N	Mean	SD	t-value	p-value
Pre-test MMO Score	Group A	15	28.40	7.25	1.234	0.2275
	Group B	15	31.73	7.53		
Post-test MMO Score	Group A	15	36	4.17	4.415	0.0003
	Group B	15	37.73	4.83		

Table 2 above, a comparison was made between the pre-test mean and Standard Deviation (SD) of Maximum Mouth Opening (MMO) for both Group A and Group B, with a resulting t-value of 1.234 and a p-value of 0.2275. This indicates there is no significant difference in the pre-test MMO scores between the two groups. However, upon comparing the post-test mean and SD of the MMO scores of both groups, a t-value of 4.415 and a p-value of less than 0.0003 were observed. This implies a significant difference in the post-test MMO scores between the two groups.

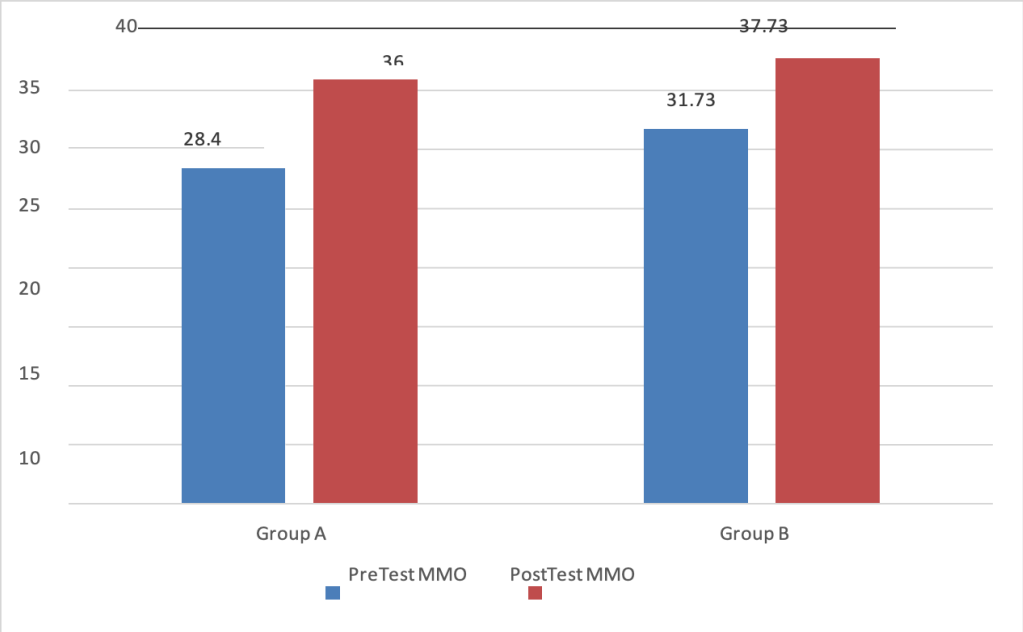

Figure 2: Comparison of pretest and post test MMO scores in Group A and Group B

Table 3: Comparison of group A and group B with respect to TMD scores by paired t-test

Groups	Test	Mean	SD	Paired t	P value
Group A	Pretest	27.0	0.11	7.70	
	Post test	2.54	0.03		<0.0001
Group B	Pretest	26.11	0.14		
	Post test	11.67	0.07	3.74	0.0022

*p<0.05

Table 3 demonstrates a significant comparative difference in pre and post-test scores for both Group A and Group B. In Group A, adjustments in the TMD function score were prominent. The pre-test average was at 29.3 with a standard deviation of 0.11, while the post-test average plummeted to 3, holding no standard deviation value, with the t-value listed as 'a'. The significance level (p-value) was less than 0.0001, confirming that the displayed change was statistically relevant. For Group B, there was also a considerable difference noted between the pre and post pain scores. The pre-test mean stood at 27 with a standard deviation of 0.014. This value declined to 12 with a 0.07 standard deviation in the post-test assessment. The t-value was 43.5 and the p-value was less than 0.0001 - another statically significant variation. Therefore, both groups revealed marked changes between their initial and final results.

Table 4: Comparison of group A and group B with respect to TMD scores by unpaired t-test

Variable	Group	N	Mean	SD	t-value	p- value
Pre-test TMD	Group A	15	27.02	11.7		
scores	Group B	15	26.11	14.87	0.09	0.9289
Post-test TMD	Group A	15	2.54	3.83		
scores	Group B	15	11.6	7.28	4.29	0.0002

*p<0.05

In the above Table 4, pre-test mean and SD of pain scores of both, Group A and Group B were compared and t=0.089atp=0.9289. This shows that there is no significant difference between pre-test pain scores between the two groups. In the abovetable7, post-test mean and SD of pain scores of both, Group A and Group B were compared and t= 4.29at p= <0.0002. This shows that there is a

significant difference between post-test values of pain scores between the two groups.

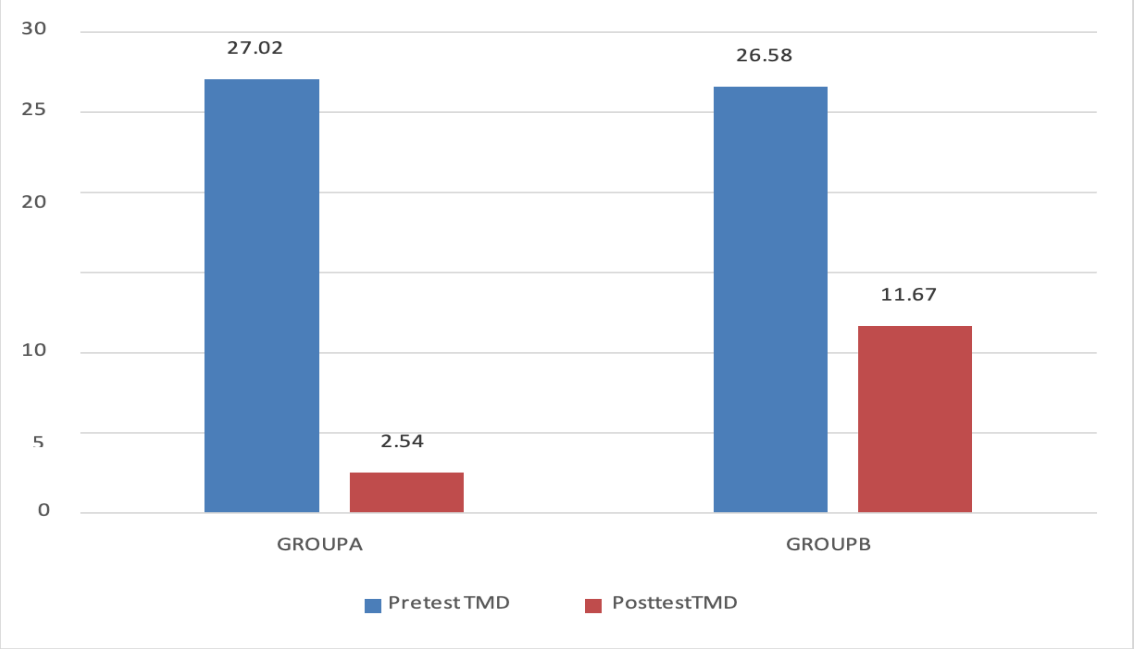

Figure 3: Comparison of group A and group B with respect to TMD scores

Effect size

The effect size between Group-A and B for NPRS is -1.42TheeffectsizebetweenGroup-AandBfor MMOis-0.38
The effect size between Group-A and B for TMD Index is 1.63The effect size classification is as follows:

No effect	D<0.20
Mild effect	0.20 < d < 0.50
Moderate effect	0.50 < d < 0.80
Large effect	0.80<d<1.20
Very large effect	d > 1.2

Interpretation of results:

The result shows that there is a significant difference between the two groups. According to the unpaired t-test, the Pre and post-scores between groups for the Numeric pain rating scale are <0.2761 and 0.0018, Pre and post-scores for Maximal mouth opening are 0.2275 and 0.0003, and Pre and post-TMD scores are 0.9289 and 0.0002. The results show that there are significant statistical differences between the two groups. Hence, the research hypothesis was accepted.

Discussion

Through this study, an assessment of the efficacy of Dry Needling and Trigger Point Release methods in treating masticatory myofascial pain was conducted. Two intervention groups were treated with these methods over a bi-weekly period. Outcome measures were based on improvements in the Numeric Pain Rating Scale, Maximal Mouth Opening, and Temporomandibular Disability Index. The results indicated that both intervention groups showed significant improvement in all outcome measures, with Dry Needling yielding superior outcomes. Amplified pain-free maximal jaw opening suggests Dry Needling may alleviate pain in the masticatory muscles, reducing tension in taut bands. This reduction could lead to tempered motor unit activity at trigger points, thereby improving motor function. Both groups experienced an increase in maximal mouth opening and a decrease in disability levels, implying pain reduction enables patients to freely engage in more activities, thereby reducing disability levels.

Further studies suggest that Dry Needling may stimulate large myelinated fibres and C-fibers, activating afferent signals leading to the spinal cord and higher pain processing centres. This aligns with the findings of Chou et al., On the other hand, Trigger Point release works by normalizing sarcomere length in contracted muscle units, as explained by studies conducted by Allan Kalamir. Lastly, Nelson and Larkin's possible mechanism for Trigger Point release is explored: the temporary ischemia during the application of pressure is relieved by reactive hyperemia once pressure is released. Both groups received further treatment via muscle stretching, which helped to break the aforementioned ischemia cycle. The study ultimately showcases the relative efficacy of Dry

Needling and Trigger Point Release in alleviating masticatory myofascial pain, increasing maximal mouth opening, and reducing disability levels in related patients.

Conclusion

The study provides a comprehensive understanding of MMP treatment efficacy. It compares two interventions - Dry Needling and Trigger Point Release. Findings suggest both are effective, but Dry Needling shows superior outcomes with significant improvement in the Numeric Pain Rating Scale, Maximal Mouth Opening, and Temporomandibular Disability Index. This suggests that Dry Needling can alleviate masticatory muscle pain and reduce disability levels. Thus, the study reinforces the potential of these interventions in MMP management. Future research is recommended to expand understanding of these techniques' optimal applicability and underlying mechanisms, paving the way for enhanced patient care.

Limitations

1. Not all participants in the TMD Disability Index filled out the section inquiring about their sexual function.

2. More efficient outcome measures, such as pain pressure threshold, could have been implemented in this research.

3. The sample size for this study was relatively small, potentially impacting the results.

Suggestions for Future Research

1. Future research should examine the effects of Dry needling on other types of facial myofascial pain.

2. Future studies should aim to work with a larger sample size for more statistically sound results.

3. Efforts should be made to ensure an equal distribution of genders in future studies.

Bibliography

1. American Society of Temporomandibular Joint Surgeons. Guidelines for diagnosis and management of disorders involving the temporomandibular joint and related musculoskeletal structures. Cranio 2003; 21: 68-76.
2. Travell JG. Travell and SimonsMyofascial Pain and Dysfunction: The Trigger Point Manual, vol. Upper Half of Body. Williams & Wilkins, Baltimore; 1983
3. McMillan AS, Nolan A, Nelly PJ. The efficacy of dry needling and procaine in the treatment of myofascial pain in the jaw muscles. J Orofac Pain. 1997; 11: 307-14.
4. Zakrzewska JM, Hamlyn PJ. Facial pain. In : Crombik IK , craft PR, Linton SJ , at el,eds .Epidemiology of pain , seattle, WA ; IASP Press, 1999 : 171-202
5. Martin WJJM, Perez RSGM, Tuinzing DB, Forouzanfar T. Efficacy of antidepressants on orofacial pain: a systematic review. Int J Oral Maxillofac Surg [Internet]. Elsevier; 2015 Mar 26;41(12):1532–9.
6. National Institute of Dental and Craniofacial research. http://www.nidcr.nih.gov/ DataStatistics /Find Data By Topic /FacialPain/
7. LeResche L. Epidemiology of temporomandibular disorders: implications for the investigation of etiologic factors. Crit Rev Oral Biol Med. International and American Associations for Dental Research; 1997;8(3):291–305. Merskey H, Bogduk N 1994 classification of chronic pain, Seattle, WA, IASP Press.
8. Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for Clinical and Research Applications: Recommendations of the International RDC/TMD Consortium Network and Orofacial Pain Special Interest Group. Schiffman E, et al, J Oral Facial Pain Headache. 2014 Winter;28(1):6-27. doi: 10.11607/jop.1151.
9. Schiffman E, Ohrbach R, Truelove E, International RDC/TMD Consortium Network,
10. J Oral Facial Pain Headache. 2014 Winter;28(1):6-27
11. Simons, D. G., Travell, J. G., & Simons, L. S. (1999). *Travell& Simons' Myofascial Pain and Dysfunction: Upper half of body*. Williams & Wilkins.
12. Han, S. C., & Harrison, P. (1997). Myofascial pain syndrome and trigger-point management. *Regional Anesthesia and Pain Medicine*, *22*(1), 89–101.
13. Zhang, Y., Ge, H.-Y., Yue, S.-W., Kimura, Y., & Arendt-Nielsen, L. (2009). Attenuated skin blood flow response to nociceptive stimulation of latent myofascial trigger points. *Archives of Physical Medicine and Rehabilitation*, *90*(2), 325–332.
14. Ito H, Okimoto K, Mizumori T, Terada Y, Maruyama T. A clinical study of the relationship between occlusal curvature and craniomandibular disorders. Int J Prosthodont 1997;10(1):78-82
15. Fricton JR. Etiology and management of masticatory myofascial pain. J Musculoskeletal Pain 1999;7(1/2):143-160
16. Kerstein RB. Treatment of myofascial pain dysfunction syndrome with occlusal therapy to reduce lengthy disclusion time-a recall evaluation. Cranio 1995;13(2):105-15.
17. Flor H, Birbaumer N, Schulte W, Roos R. Stress-related electromyographic responses in patients with chronic temporomandibular pain. Pain 1991;46(2):145-52.

18. Svensson P, Burgaard A, Schlosser S. Fatigue and pain in human jaw muscles during a sustained, low-intensity clenching task. Arch Oral Biol 2001;46(8):773-7. 44.
19. Mense S. The pathogenesis of muscle pain. Current Pain and Headache Reports 2003;7(6):419-425.
20. Treatment of temporomandibularmyofascial pain with deep dry needling. Luis M. Gonzalez-Perez, Pedro Infante-Cossio, Mercedes Granados-Nuñez, Francisco J. Urresti-Lopez4. Med Oral Patol Oral Cir Bucal. 2012 Sep; 17(5): e781–e785. doi: 10.4317/medoral.17822
21. Mense, S., &Gerwin, R. D. (2010). *Muscle pain: diagnosis and treatment*. Springer Science & Business Media. Jones Oliver, The Muscles of Mastication, TeachMeAnotomy; 2014
22. Fricton, J. R. (1998). Masticatory myofascial pain: an explanatory model integrating clinical, epidemiological and basic science research. *Bulletin Du Groupement International Pour La Recherche Scientifique En Stomatologie & Odontologie*, *41*(1), 14–25.
23. McCain GA. "Fibromyalgia and Myofascial Pain Syndromes**.**" In Wall, PD; and Melzack R, *Textbook of Pain* (3rd Edition). Churchill Livingstone. New York. 1994.
24. Grosshandler, S. L., Stratas, N. E., Toomey, T. C., &Gray, W. F. (1985). Chronic neck and shoulde6r pain. Focusing on myofascial origins. *Postgraduate Medicine*, *77*(3), 149–151.
25. Rachlin, E. S., &Rachlin, I. S. (2002). *Myofascial pain and fibromyalgia: trigger point management*. Mosby In. Bronfort, G., Haas, M., Evans, R., Leininger, B., & Triano, J. (2010). Effectiveness of manual therapies: the UK evidence report. *Chiropractic & Manual Therapies*, *18*(1), 3.
26. Fernández-Carnero, J., La Touche, R., Ortega-Santiago, R., Galan-del-Rio, F., Pesquera, J., Ge, H.-Y., & Fernández-de-las-Peñas, C. (2010). Short-term effects of dry needling of active myofascial trigger points in the masseter muscle in patients with temporomandibular disorders. Journal of Orofacial Pain, *24*(1), 106.
27. Beltran-Alacreu, H., López-de-Uralde-Villanueva, I., Paris-Alemany, A., Angulo-Díaz-Parreño, S., & La Touche, R. (2014). Intra-rater and Inter-rater Reliability of Mandibular Range of Motion Measures Considering a Neutral Craniocervical Position. Journal of Physical Therapy Science, 26(6), 915.
28. SOHAIL, A., & AMJAD, A. (2011). the range of inter-incisal opening among university students of Ajman, UAE. Pakistan Oral & Dental Journal, 31(1).
29. Dijkstraeta. The validity and reliability of four different method of assessing the TMJ mobility. DOI: 10.1046/j.1365-2842.1999.00358.
30. Beltran-Alacreu, H., López-de-Uralde-Villanueva, I., Paris-Alemany, A., Angulo-Díaz-Parreño, S., & La Touche, R. (2014). Intra-rater and Inter-rater Reliability of Mandibular Range of Motion Measures Considering a Neutral CraniocervicalPosition.Journalof Physical Therapy Science, 26(6), 915.
31. Ferreira-Valente, M. A., Pais-Ribeiro, J. L., & Jensen, M. P. (2011). Validity of four pain intensity rating scales. PAIN®, 152(10), 2399–2404.
32. Steigerwald DP, Maher JH: The Steigerwald/Maher TMD disability questionnaire. Today's Chiropractic 1997; July-August:86-91.
33. Chou LW, Kao MJ, Lin JG. Probable mechanisms of needling therapies for myofascial pain control. Evid Based Complement Alternat Med. 2012;2012:705327
34. 38. Simons DG, Travell JG, Simons LS, Cummings BD. Travell & Simons'myofascial pain and dysfunction: the trigger point manual. 2nd ed. Vol. 1. Baltimore, MD: Lippincott Williams & Wilkins; 1998.
35. Shah JP, Danoff JV, Desai MJ, Parikh S, Nakamura LY, Phillips TM, et al. Biochemicals associated with pain and inflammation are elevated in sites near to and remote from active myofascial trigger points. Arch Phys Med Rehabil 2008;89:16–23
36. [PubMed]Simons DG. New views of myofascial trigger points: etiology and diagnosis. Arch Phys Med Rehabil 2008;89:157–9 [PubMed]