

TREATMENT OF MYOFASCIAL PAIN PATIENTS USING FULL COVERAGE OCCLUSAL SPLINT THERAPY: AN ORIGINAL ARTICLE

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ABSTRACT:

Aim: To evaluate the efficacy of Full Coverage Occlusal Splint therapy in the treatment of patients with Myofascial Pain.

Materials and Methods: 15 patients were included in the study suffering from myofascial pain dysfunction syndrome will be given full coverage occlusal splint therapy. In such patients subjective and objective assessments were evaluated at the time of diagnosis, after the first week of initiation of therapy and every month for three months of follow up.

Results: There was gradual reduction in VAS scores, muscle tenderness and significant improvement in mouth opening is seen during the follow-up period.

Conclusion: Full coverage occlusal splint therapy has better long term results in reducing the symptoms of MPDS.

Keywords: TMJ, MPDS, Full Coverage Occlusal Splint Therapy.



INTRODUCTION:

“It is not stress that kill us, it is our reaction to it” there are thousands of causes for stress & one antidote to it is self-expression.

Schwartz hypothesized that due to increased level of stress, individuals were susceptible to involuntary habits like jaw clenching, grinding, nocturnal bruxism which resulted in muscle spasm & had deleterious effects on the temporomandibular joint & associated musculature. Also occlusal abnormalities were found to play a secondary role.^[1]

With modernization, stressful life, competition in career making, physical, mental and psychological stress, nuclear family, mental burden, strained relationships, financial insecurity in the world of sinking economy, ambition about job etc. are increasing in

population most commonly in young adult and middle aged individuals which are affecting on the routine life of individuals characterised by development of symptoms like headache, earache, back ache, muscle pain, increased parafunctional habits like bruxism, clenching which has deleterious effects on jaw muscles, TMJ and associated structures.

Due to referral nature of myofascial pain to the pre auricular region, temporal region, occipital region, shoulder and neck region large number of patients are misdiagnosed or undiagnosed and referred to other medical specialist such as neurophysicians, ENT specialists and orthopaedic surgeon where they only get symptomatic treatment, while most

of the time the problem lies in dentition status.

MPDS is characterised by reported pain in masticatory muscles, in the jaw, temples face, pre auricular area or inside the ear at rest or function.^[2]

However, in literature we found very few studies carried out to find out the efficacy of occlusal splint therapy in the treatment of the masticatory muscles pain.

Out of all these treatment modalities, we have selected full coverage occlusal splint therapy as it is non-invasive treatment modalities where occlusal splint therapy is of prognostic value for permanent occlusal changes.

MATERIALS AND METHODS:

The proposed study had included fifteenth subjects (sample size, n=15) diagnosed with myofascial pain according to Research Diagnostic Criteria for Temporomandibular disorder (RDC/TMD).^[3,4] published by university of Washington in 2011 from the patients reporting to outpatient department of our institute.

RDC/TMD Criteria includes –

- Reported pain in masticatory muscles, in the jaw, temple, face, pre auricular area or inside the ear, at rest or function.
- Pain on palpation in at least three sites one of them at least in the same side of the reported pain.

- Myofascial pain with limited opening.

For study case a thorough case history and clinical examination of muscles of mastication & dentition status will be recorded in a specially designed proforma along with a written informed consent. In all the patients included in the study the following parameters were examined and recorded before during and after the treatment. These findings were recorded on the day of starting the treatment, and thereafter the parameters were regularly reassessed after 7 days, 1 month, 2 months and 3 months periods

1. Pain analysis with the help of VAS score
2. Interincisal distance in mm.
3. Tenderness on palpation with the help of objective pain scale.

VAS score ^[5]

0(zero) value indicates no pain; 1(One) to 3(Three) value indicates mild pain; 4(four) to 6(six) value indicates moderate pain; 7(seven) to 9(nine) value indicates severe pain; 10(ten) value indicate worst possible pain.

Objective pain scale ^[6]

0 (zero) value indicates no pain; 1 (one) value indicates verbally reported pain; 2 (two) value indicates pain or discomfort followed by fascial musculature contraction and 3 (three)

value indicates when the patient backed away or showed lacrimation.

Fabrication of full coverage occlusal splint (fig. 1)

1. Putty light body impression of both maxillary & mandibular arch is made by double step, double mix technique & it is poured with a gypsum product (preferably with die stone) after 30 min as per manufacturer's instruction. When the stone is adequately set, the cast is withdrawn from the impression. Cast should be free of bubbles & voids. Excess stone over labial & lingual to teeth is trimmed on a model trimmer to the depth of the vestibule.
2. Duplicate the cast with the help of dental stone to preserve the original condition.
3. Took a verified centric relation record by using anterior stop technique as given by Dawson.^[7]
4. The great advantage of the anterior deprogrammer is that it deprogrammer the lateral pterygoid muscle, allowing condyle disc assemblies to seat up without any deflection or restriction from posterior teeth.
5. The wax bite record taken in combination with an anterior deprogramming device. Soften the Alu-wax at the edges after immersing in hot water. Do not soften the middle section of the wax. Place the wax against the upper arch, and compress it to lightly indent it. While the assistant holds the wax wafer in place against the upper arch before having the patient close into the wax. Posterior teeth will be recorded with indentations that will hold the cast in stable relationship with the bite record. Wax trimmed back to buccal cusp tips. Remove it & chill it in cold water to make it brittle hard.
6. Relationship of the maxilla to the base of the skull was recorded by using FB 1500 facebow of CORI DENT Company.
7. Facebow transfer did on CSA 600 CORI DENT articulator to mount upper cast. Afterward centric relation bite record was used to mount lower cast.
8. Block out all the undercuts involving proximal & occlusal surface with the help of dental stone or dental plaster.
9. Marking done over the cast with the help of pencil, labially involving one third of teeth surfaces & palatally 3mm away from the gingival margin.
10. Wax up done with the help of modelling wax after building proper, smooth anterior guidance, canine guidance & flat occlusal surface posteriorly where only functional cusps should touch.
11. Prepared wax pattern sent to the dental laboratory for acrylization (heat cure).
12. Splint insertion done along with correcting the minor problems like retention, occlusal correction including anterior & canine

guidance, their should be light contacts anteriorly & heavy contacts posteriorly while examining with the help of articulating paper.

13. Recall & readjustment of splint done after every month for the period of three month

RESULTS:

Out of 15 patients, 12(80%) patients were female & 3(20%) patients were male. (fig. 2)

VAS score highly decreased from 7.86 to 1.6 i.e from pre study period to 3 months of duration which showed drastic reduction in VAS score. (fig. 3)

Mouth opening was increased significantly by 1-2 mm (fig.4).

Objective pain scale score for muscle tenderness between the groups was shown in (fig. 5).

Most common etiological factors for myofascial pain found in study population was parafunctional habits & occlusal interferences followed by attrition, occlusal facets, crowding, partially erupted 3rd molar, restored teeth, infra erupted teeth, destructed teeth due to caries, missing teeth, deep bite, abfraction & open bite. (table 1)

Most common occlusal interference found in study population was loss of right side of canine guidance followed by loss of left side of canine guidance, loss of anterior guidance, flat curve of willson, with minimum 1mm & maximum 1.5mm curve of spee. (table 2)

DISCUSSION:

The female predominance was seen which may be attributed to susceptibility of females to emotional stress, hormonal imbalances & the presence of estrogen receptors in women that are absent in men, in addition to this women are less tolerant of pain, exhibit lower pain threshold or may be more sensitive to pain.^[8] This was in the agreement with the studies performed by Schiffman E et al.^[9], Okeson JP.^[10]

Post treatment follow up assessment was done after 7 days, 1 month, 2 months & 3 months period on the basis of VAS score, mouth opening & muscle tenderness. The above criteria were also used in studies done by Naikmasur et al (2008),⁵ Anuj Mishra et al (2009).^[11]

Subjects were advised to wear the full coverage occlusal splint during night time for 3 months. (S.J. Davies & R.J.M Gray 1997). The set criteria were assessed & the results were found to be statistically significant at P value < 0.001. High statistical reduction in VAS score was seen. Improvement in mouth opening & muscle tenderness score was significantly reduced for masseter, temporalis, medial pterygoid & for lateral pterygoid muscles with P value <0.001. Tenderness score for posterior mandibular & for Submandibular region also decreased. This improvement can be explained by following fact that occlusal splint give equal intensity contacts on all teeth, bring immediate disocclusion of all

posterior teeth by the anterior teeth & condylar guidance in all movements. This will relax the elevator & positioning muscles & contribute to the reduction of abnormal muscle hyperactivity. Occlusal splint when placed intraorally can reduce the load on TMJ by decreasing the intensity of force & duration of parafunctional activities. It also deprogrammes the muscles & helps to reduce the pain, increase mouth opening & reduces the muscles & joint palpation tenderness.

Increase in mouth opening must have been because splint helped to distribute the heavy functional occlusal forces & hastened relief from muscle spasm which led to increase in mouth opening.

In existing study, along with tenderness of muscles of mastication, we found that 7 patients had tenderness in trapezius muscle, 9 had tenderness on left side & 6 had tenderness on right side of sternocleidomastoid muscles. This must have been because of muscle spasm chain reaction that states that if one muscle is injured or is in spasm others automatically goes into spasm like in a chain reaction.^[12] The patients who had undergone splint therapy showed reduced muscle tenderness for all the above mentioned muscles as the splint was helpful in relieving pain-tension-pain cycle for a long period & prevent forces created by parafunctional activities which are four to seven times more than that of normal. Similar features had also been reported by Okeson et al.^[13]

In our opinion, patients may indicate the pain in the auricular area and cervical muscles is often referred pain from the temporomandibular joint and associated structures.

There was no report of any serious side effects due to occlusal splint therapy but few patients had initial side effects such as dryness of mouth, occasional feeling of tightness of the appliance, and a feeling of queasiness and presence of foreign object, which gradually decreased within few days.^[5]

Out of 15 subjects, The most common dentition factor observed in existing study was parafunctional habits in subjects, occlusal interferences like 17 subjects had no anterior guidance, 20 subjects had no canine guidance towards left side. 21 subjects had no canine guidance towards right side, 5 subjects had flat curve of Wilson, attrition in 20 subjects, wear facets in 19 subjects, crowding in 9 subjects, improperly erupted third molars in 8 subjects, restored teeth in 7 subjects, infraerupted teeth in 4 subjects, destructed teeth structure due to caries in 4 subjects, missing teeth in 2 subjects, deep bite 2 in subjects followed by open bite in 1 subject. Parafunctional habit and occlusal interference was very highly significantly associated with MPDS. Similar features had also been reported by Schwartz & Laskin (1995).^[14] Tenderness of SCM and trapezius may be associated with MPDS. Our statement can be reinforced by the results of the study performed by Olivo A.^[15]

CONCLUSION:

So after evaluating the VAS score, mouth opening, muscle tenderness score & after keeping in mind about all the pros

& cons of the treatment we concluded that full coverage occlusal splint therapy play an important role in the treatment of myofascial pain patients.

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FIGURES:

Fig. 1 Fabrication of full coverage occlusal splint



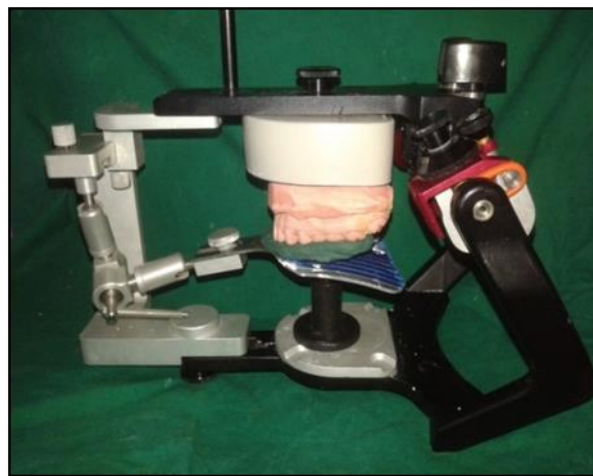
Rubber base impression of upper & lower jaw



Upper & lower model poured with die stone



facebow record



Facebow record transferred on articulator



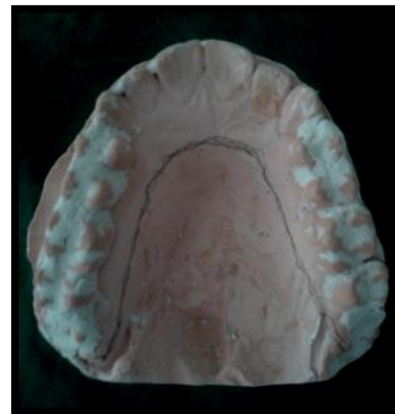
Mounting of the upper model with (orientation jaw relation) facebow



Mounting of the lower model with centric relation record



Marking the outline of occlusal splint covering 1/3rd area labially



Palatal marking & blocking out all the undercuts area with dental plaster



Occlusal & side view of wax pattern of occlusal splint





Left working canine guidance



Right non working canine guidance



Final occlusal splint insertion in oral cavity in centric occlusion



Right working canine guidance



Left non working canine guidance



Anterior guidance

Fig. 2 - Distribution of patients based on gender

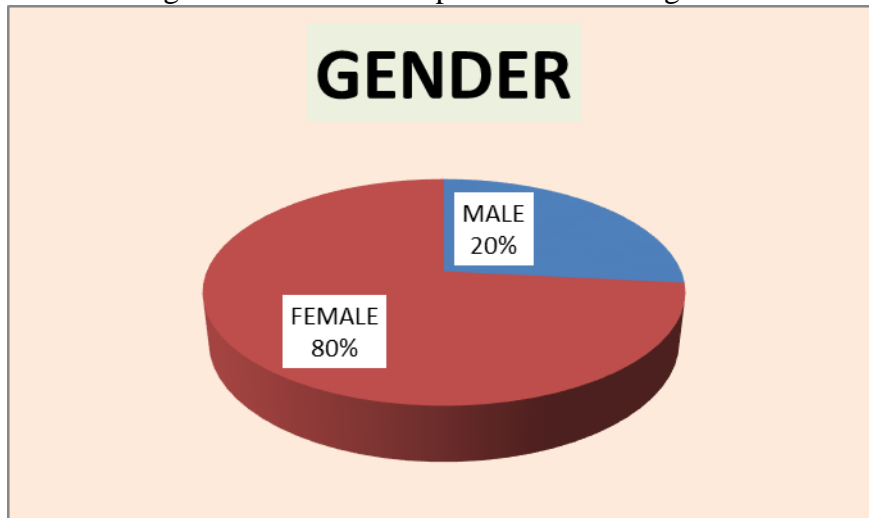


Fig. 3 – VAS Score assessment

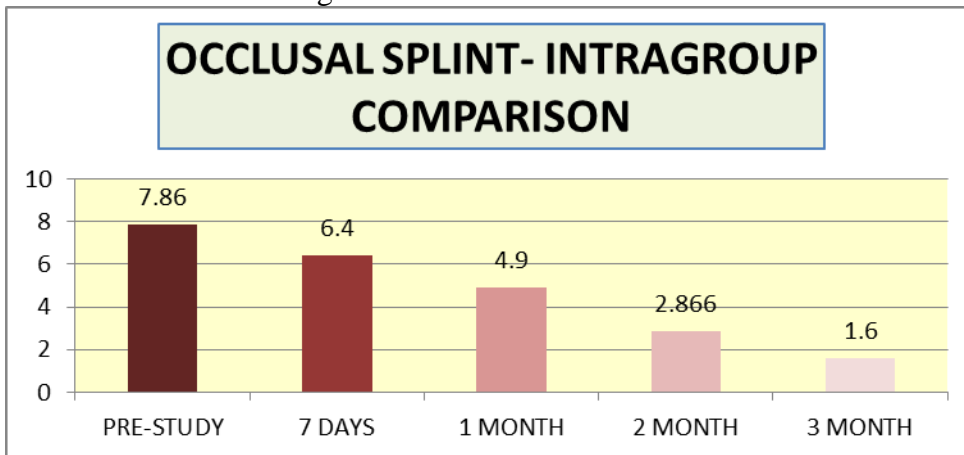


Fig. 4 – Mouth opening assessment

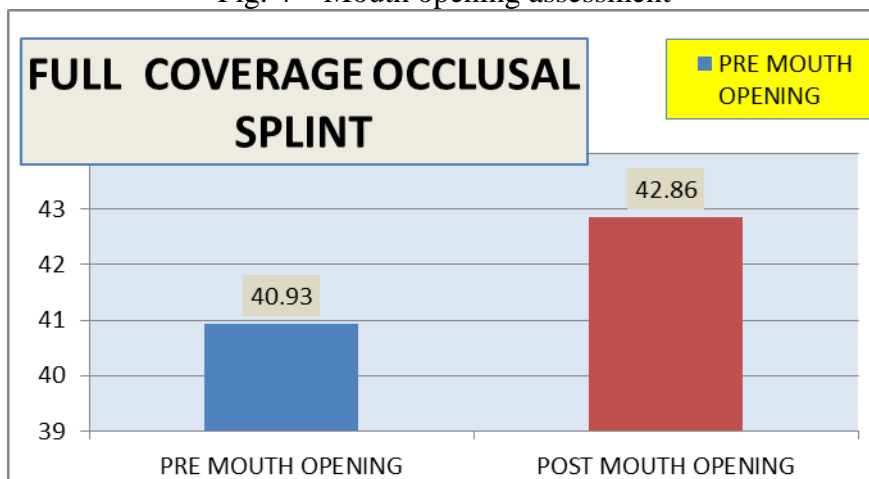


Fig 5a. Pre-Muscle tenderness assessment

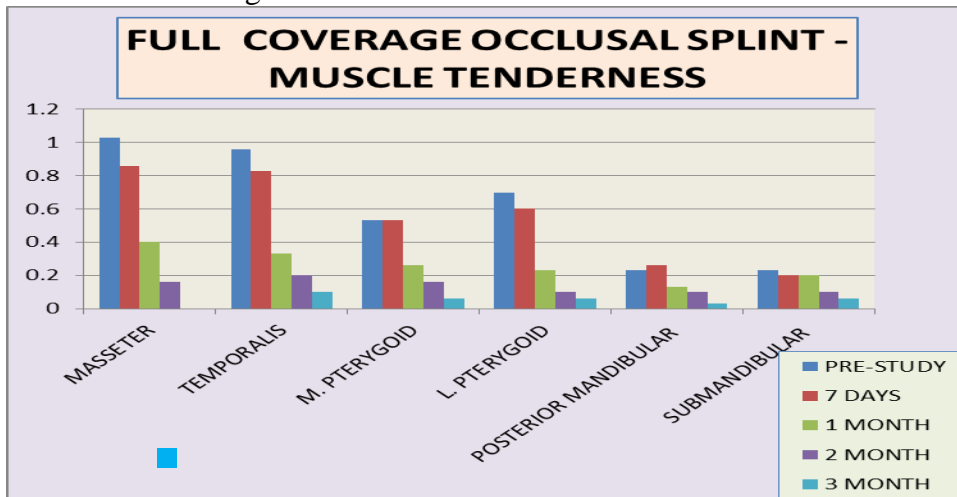


Fig. 5b – Muscle tenderness at 7 days period

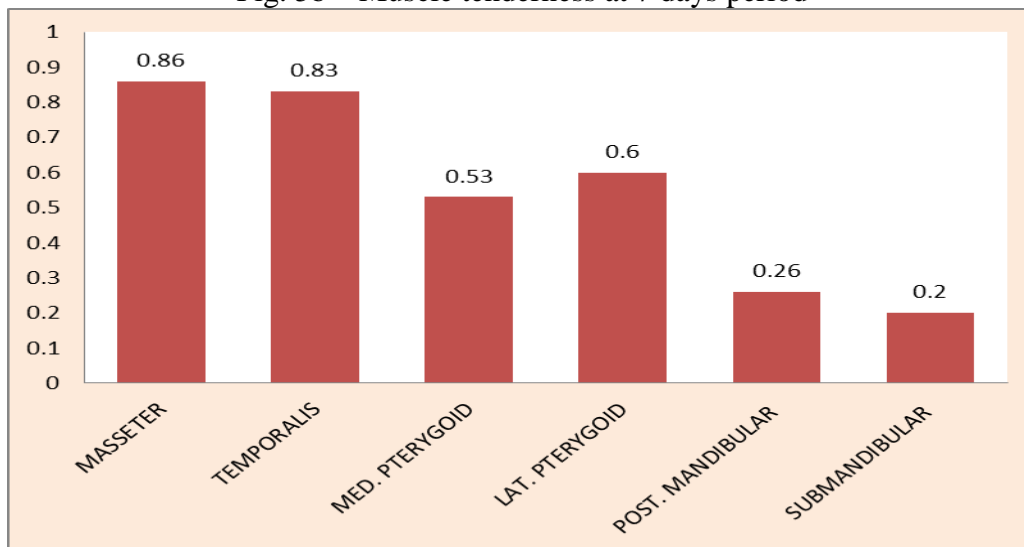


Fig. 5c – Muscle tenderness at 1 month period

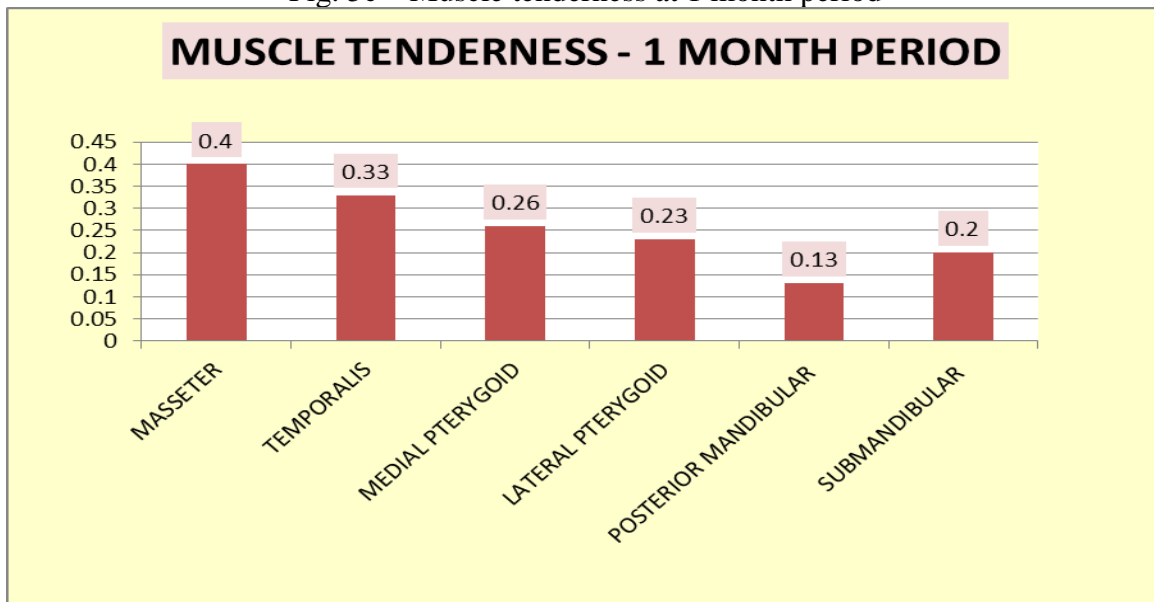


Fig. 5d – Muscle tenderness at 2 months period

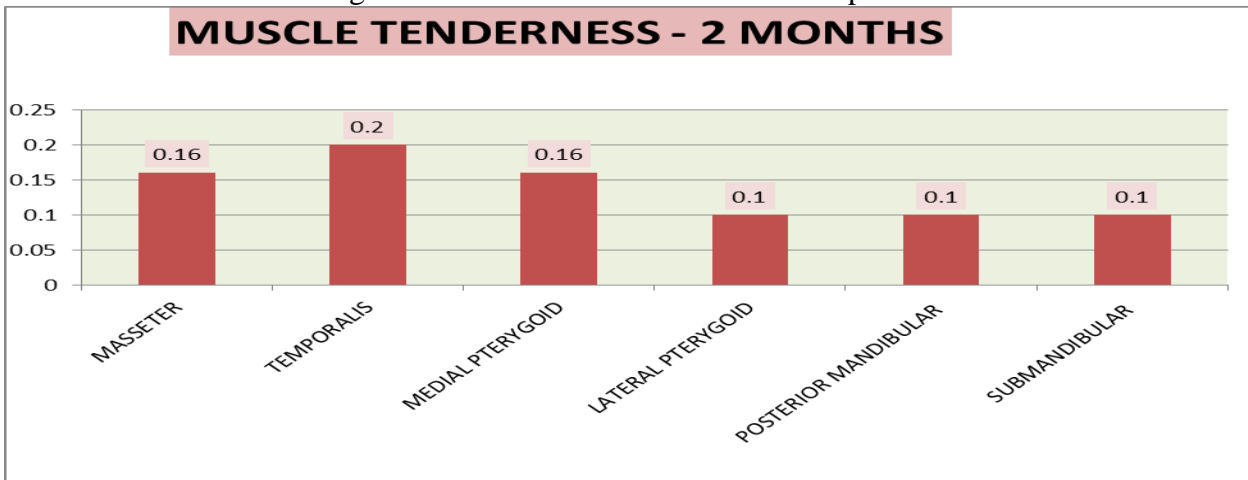
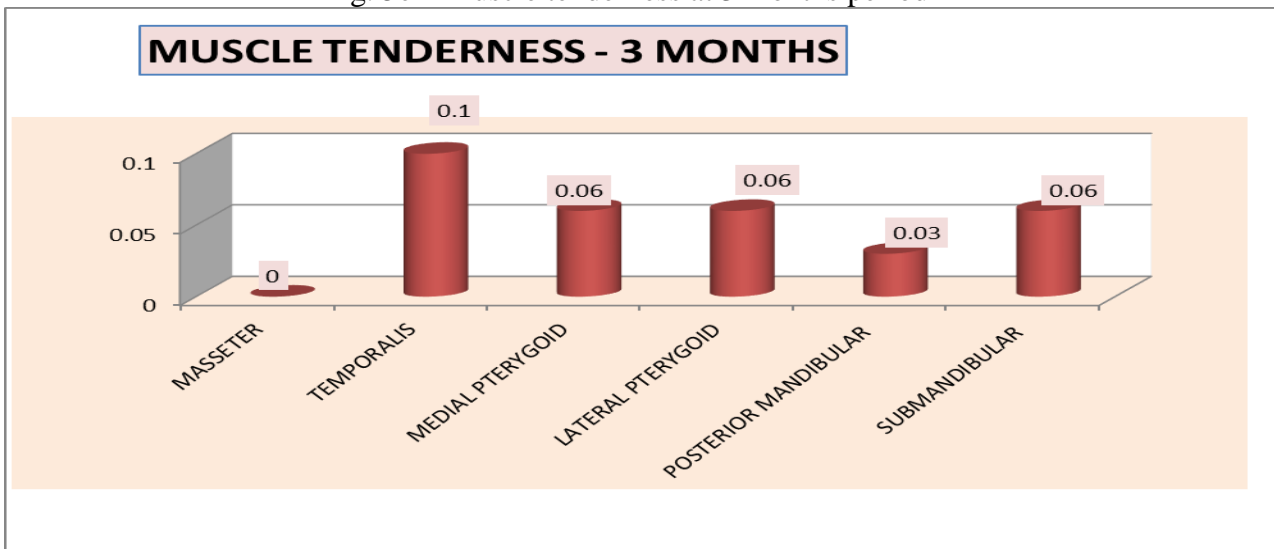


Fig. 5e – Muscle tenderness at 3 months period



TABLES:

Table 1: Distribution of dentition factors among study population

DENTITION FACTORS	n	%
1) OCCLUSION		
a) Class I malocclusion	11	80 %
b) Class II malocclusion	1	3.3 %
c) Class III malocclusion	1	3.3 %
d) Not recorded	2	13%
2) MISSING TEETH		
a) YES	1	6.6%
b) NO	14	93.3%
3) CROWDING		
a) YES	5	33.3%
b) NO	10	66.6%

4) ATTRITION		
a) YES	10	66.6%
b) NO	5	33.3%
5) OCCLUSAL FACET		
a) YES	9	63.3%
b) NO	6	36.7%
6) ABFRACTION		
a) YES	1	3.3%
b) NO	14	96.6%
7) CARIES		
a) YES	2	13.3%
b) NO	13	86.6%
8) RESTORED		
a) YES	3	23.3%
b) NO	12	76.6%
9) IMPACTED (partially erupted 3rd molar)		
a) YES	4	26.6%
b) NO	11	73.3%
10) DEEP BITE		
a) YES	1	6.6%
b) NO	14	93.3%
11) OPEN BITE		
a) YES	1	3.3%
b) NO	14	96.6%
12) CROSS BITE		
a) YES	0	0%
b) NO	15	100%
13) PFH		
a) YES	11	73.3%
b) NO	4	26.6%
14) SUPRAERUPTED		
a) YES	0	0%
b) NO	15	100%
15) INFRAERUPTED		
a) YES	2	13.4%
b) NO	13	86.6%

16) FREMITUS		
a) YES	0	0%
b) NO	15	100%

DENTITION FACTORS (n=30)	MINIMUM	MAXIMUM	MEAN	STD.DEVIATION
17) MIDLINE SHIFT -LEFT	0	1.5	0.3	0.46
18) MIDLINE SHIFT - RIGHT	0	1	0.14	0.351
19) OVERJET	0	1.5	1.14	0.37
20) OVERBITE	0	1.5	1.18	0.318

Table 2: Distribution of occlusal interferences among study population

OCCLUSAL INTERFERENCES	n	%
1) ANTERIOR GUIDANCE		
a) PRESENT	6	43.3
b) ABSENT	9	56.7
2) CANINE GUIDANCE-LEFT		
a) PRESENT	5	33.3
b) ABSENT	10	66.7
3) CANINE GUIDANCE- RIGHT		
a) PRESENT	4	30
b) ABSENT	11	70
4) CURVE OF WILSON		
a) PROTUDED	10	60.5
b) FLAT	5	32.9

OCCLUSAL INTERFERENCES	MINIMUM	MAXIMUM	MEAN	STD.DEVIATION
5) CURVE OF SPEE	1	1.5	1.27	0.178