Efficacy of Myofascial release of masseter, temporalis and its relaxation effect on gastrocnemius: A case study

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1. Background:
Stress is a feeling of emotional or physical tension. There are many factors responsible for stress which may lead to frustration, anger, anxiety and emotional imbalance. Psychological stress may result in perception of generalized body pains. There is correlation of psychological stress with facial muscle pain especially with masseter and temporalis. Psychological stress induce mechanical selectivity of these muscles lead to formation of MTrP[1]. In this case the patient came with generalized pain in the back region, and facial pain on tooth clinching and calf tightness. To best of our knowledge calf tightness along with facial pain and generalized back pain is not a previously reported association.

2. Case presentation:
A 33-year-old Assistant professor came with 2 years of pain facial region, temporal region and back region was reported to physiotherapy O.P.D. The patient was perusing Ph.D. and also taking lectures of students on daily basis. There was no history of any trauma or fall. The patient had history of persistent thinking about Ph.D. work and not been able to give sufficient time to their family members even after off-time. There was no significant family, social history; PT was non diabetic, non-smoker and non-alcoholic. The PT was no significant medical history and drug history. Regarding pain history, the patient complains of pain in the facial region especially during clinching and generalized pain over the back; along with PT feels tightness in the calf region more at night time while sleeping. The pain onset was gradual in nature which varies in intensity on VAS Ranges from 3-6 results of mild to moderate in intensity. There was no specific reliving factor but due to work and constant thinking patterns the pain may increase; duration of pain was infrequent or intermittent. On examination by palpation there was tenderness over temporal region and zygomatic region. On assessment there was generalize pain over back muscles.
palpated were QL, erector spine, vertical fibers of LD and SPI. Out of these muscles QL and LD were show tenderness grade 3 but no tenderness was found in other the muscles. Calf tightness is measured with knee to wall test and by taking ROM. The ROM Dorsiflexion for Rt. foot was 12° and Lt. foot was 15° on pre-test measurement.

3. Differential diagnosis
Given the symptomatic presentation of generalized body pain need to be differentially diagnosed. However, in the first outlook seems to be a case of generalized weakness. SLR, slump test found to be negative for low back pain whereas Faber’s test, compression and distraction also found to be negative for SI dysfunction. On examination with algometer pain pressure threshold found to be positive for masseter, temporalis and for QL. But for LD the PPT values was greater than 25N which means the threshold was high for LD may be because of latent triggers or just pressure pain; in rest of muscles there were active triggers especially more sensitive at facial and temporal region which respond to pressure less than 25 N. On occupation stress index the patient score comes out to be 134 which falls between 116-161 considered to be moderate level occupational stress.

4. Treatment
After differential diagnosed the condition, Pre-assessment of patient was assessed for Pain, pain pressure threshold, occupational stress index, ankle ROM and tightness of calf by VAS, algometer, occupational stress index questionnaire, Universal goniometer and knee to wall test. Treatment was provided to patient; deep transverse friction massage given to masseter and temporalis for a period of 10 minutes, 2 minute’s gentle followed by 8 minutes hard in 6 cycles along with deep breathing exercise [2]. There were total of 5 MFR after treatment sessions were provided one session after every 24 hours. After the completion of treatment, post assessment reading taken from patient for pain, PPT, OSI, ankle ROM and assess calf muscle tightness again. Post assessment is followed by 3 follow up sessions and home advice.

4.1 Instrumentation used:
1. Algometer which is valid and reliable tool [3]
2. 10 cm measuring scale and marker
3. Universal goniometer which is valid and reliable tool [4]

5. Outcome measures, follow up and advice
5.1 Outcome was measured by using:
1. visual analog scale which is valid and reliable tool [5]
2. Pain pressure thresh hold by using algometer
3. occupational stress index which is valid and reliable to detect occupational stress [6]
4. Ankle Range of motion by using universal goniometer

5. knee to wall test for calf tightness which is valid and reliable source to check calf tightness[7]

Starting from day 1 the patient shows a lot of improvement in their pain and have explained a feeling of overall body relaxation. Every subsequent treatment sessions after 24 hours shows greater improvement in PT condition, feeling of calf tightness and even back pain with period of time decrease. At the end of five treatment sessions post assessment readings were taken which shows a greater improvement in pain, pain pressure threshold, QSI goes down to 114, relaxed calf evaluated by knee wall test and ankle ROM. To maintain the improvement only 3 possible follow ups sessions were given to patient followed by home advice to do self-masseter and temporalis release and calf eccentric stretches.

6. Results

Table:1

<table>
<thead>
<tr>
<th>Pre_VAS_Mess</th>
<th>Post VAS Mess</th>
<th>Pre_VAS_Temp</th>
<th>Post_VAS_Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>2</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Pre_VAS(QL)</td>
<td>Post_VAS(QL)</td>
<td>Pre_QSI</td>
<td>Post_QSI</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>134</td>
<td>114</td>
</tr>
<tr>
<td>Pre_ppt_mess</td>
<td>Post_ppt_mess</td>
<td>Pre_ppt_Temp</td>
<td>Post_ppt_Temp</td>
</tr>
<tr>
<td>16N</td>
<td>28N</td>
<td>15N</td>
<td>27N</td>
</tr>
<tr>
<td>Pre_ppt(QL)</td>
<td>Post_ppt(QL)</td>
<td>Pre_kwt_Rt</td>
<td>Post_kwt_Rt</td>
</tr>
<tr>
<td>25N</td>
<td>30N</td>
<td>5cm</td>
<td>9cm</td>
</tr>
<tr>
<td>Pre_kwt_LT</td>
<td>Post_kwt_Lt</td>
<td>Pre_Rom_Rt_ank</td>
<td>Post_Rom_Rt_ank</td>
</tr>
<tr>
<td>8cm</td>
<td>10cm</td>
<td>15°</td>
<td>20°</td>
</tr>
</tbody>
</table>

Table 2.

Pre-post reading ROM ankle

<table>
<thead>
<tr>
<th>Pre_rom_Lt_Ank</th>
<th>Post_rom_Lt_Ank</th>
</tr>
</thead>
<tbody>
<tr>
<td>12°</td>
<td>15°</td>
</tr>
</tbody>
</table>

7. Discussion

Stress is a feeling of emotional or physical tension. There are many factors responsible for stress which may lead to frustration, anger, anxiety and emotional imbalance. Psychological stress may result in perception of generalized body pains. It was mentioned in the researches that stress precipitates analgesia in the body. In the previous research, the chronic stress model suggested that there was re-establishment of the activity which is involved in
the nociceptive stimulus over a period of time. Long term stress lead to changes in the neural system involved in nociceptive stimulation[8]. In this case study the patient comes with psychological occupational stress having generalised body it means that with persistent stress pain neural modulation system alters effectively, the above research supports this case. Stress in human body can be positive and negative. Positive stress works in case of emergency situations like fear, fight and flight. The cortisol is released during stress condition but it could be harmful if individual exposed to frequent stress. Temporomandibular joint disorders occur due to stress which may lead to pain in the muscles of mastication especially masseter. many authors have stated a biopsychosocial model for the classification of the multifactorial nature of TMD built on the close relationship among physical alterations and emotional wellbeing[9]. In another research explained the concept of symptom specificity which explains the relationship between psychological stress and muscular disorders. In an experimental study shows strong correlation between psychosomatic disorder in response to stress leading to pains like head ache, facial pain and back pain etc. Previous experimental studies show that there was involvement of specific muscles in response to stress like muscles of mastication like masseter and other muscles involved were frontalis as well as temporalis but to lesser extent there was involvement of representative general body muscles like gastrocnemius and back muscles[1]. In this present case study, there is the involvement of fascial, temporalis, back and calf muscle. The patient mostly complains of pain in these muscles while sleeping or resting, but in this study there is equal involvement of all the muscles. In other research explained the physiology of involvement of fascial muscles related to sympathetic as well as parasympathetic systems which were responsible for regulation of blood flow in fascial and other muscles of the body. During stress condition our parasympathetic system did not show any noticeable change as compared to sympathetic system. On the this response the sympathetic activity may be increased with time and have shown a significant change in the haemodynamic system due to which the muscles may be deprived of oxygen and ATP lead to formation trigger points.[10] The previous study supports this present case report that due to sustained occupational stress for a longer period of time there is over activation of muscles leading to sustained contraction results in increased sympathetic influx and decreased parasympathetic activity induce fascial pain, temporalis, back pain and calf tightness. Though the evidence of calf and back involvement is very limited but in this case study, there is the involvement of both. Myofascial release followed by deep breathing technique of fascial and temporalis muscle increases blood flow, lymphatic drainage and parasympathetic influx to the area which promote overall relaxation of body. Although there no direct co-relation of masseter and temporalis with other generalised muscles of body like back muscles and calf muscles. But it is hypothesized that due to masseter and temporalis release it will increase overall body parasympathetic innervation along with deep breathing patterns and promote the relaxation of tight and contracted muscles. Further research should be emphasised on the activity of other masticatory muscles, need more evidence on back and calf muscles through EMG studies with large sample size for validation.
8. Conclusion

This case study concluded that myofascial release of masseter, temporalis induces relaxation of calf muscles as well as back muscles. Although there is no direct co-relation in between the muscles. It is hypothesized that due to the effect of increase parasympathetic activity by myofascial release induced relaxation in the body. Further researches should be emphasis on EMG based study for more evidence.

9. References


2. Massage F. Cyriax ’ s Friction Massage : A Review. 1982;


9. De JPT, H P, C F. Correlation of stress and muscle activity of patients with different degrees of temporomandibular disorder. 2015;