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Pain neuroscience education with manual therapy in cervical myofascial pain syndrome: A case report

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ABSTRACT

A 36-year-old female patient, housewife, experienced neck pain on the left side than on the right side, but more pain on the left side since last three months. The pain was characterized by a sudden onset, trigger point aggravated with limitation in range of motion with cervical flexion and painful rotation on the left side.The muscle is activated, and due to heavy work load and constant standing work, muscle stiffness is altered. So, the patient had a pain reaction that was radically different. In this study, recovery focused more on myofascial release and manual therapy and focused more on pain neuroscience education [PNE].Simply taking care of different causes of muscle induced neck pain, including myofascial pain syndrome, can significantly aid in the selection of an effective treatment plan. In this case, where neck pain is accompanied by active trigger points in muscles, manual therapy and the main focus of the pain biopsychological model in on pain neuroscience education, the comprehension of pain experiences or positive outlook on lifeand we have shown that kinesio-phobia, pain anxiety, and pain perceptions regarding pain control, physical harm, and drugs, and psychosocial characteristics can be reduced by PNE.

Keywords: Neck pain, myofascial pain syndrome, PNE, manual therapy.

Introduction:

According to the International Association for the Study of Pain, neck pain is the fourth cause of impairment that is most often discovered in today's generation of automation. It usually occurs insidiously and is characterized as pain aggravated by the location or movements of the cervical spine, and is the second most common musculoskeletal complaint(Coulter et al., 2019).Myofascial pain syndrome is a common cause of musculoskeletal pain, recognised by

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the International Association for the Study of Pain [IASP](Fernández-de-Las-Peñas and Nijs, 2019).Myofascial pain may be described as pain associated with muscle or fascia inflammation or irritation. Myofascial pain syndrome [MPS] is a common clinical problem of muscle pain involving sensory, motor and autonomic symptoms caused by myofascial trigger points.In muscles, trigger points are painful points that produce palpable nodules in muscle fibres. A pattern very similar to that of radicular pain from trigger points can develop a pattern(Azadvari and Emami Razavi, 2018).

Myofascial tiger point TrPs is a hyperirritable spot inside a stressed skeletal muscle band that is painful with tissue compression, stretch, overload, or contraction that typically responds to a referred pain perceived distant from the spot(Fernández-de-Las-Peñas and Nijs, 2019). Other symptoms can occur depending on the location of the active trigger points, such as range of motion, sensory symptoms, and even autonomic dysfunction, such as discoloration or changes in the temperature of the skin. Such trigger points are caused by muscle overload, fatigue, major and minor muscle tissue damage, psychological stress, and sleep disorders(Azadvari and Emami Razavi, 2018).

Pain is a natural occurrence in humans and is necessary for survival. However, coping with pain is not common and generally culminates in finding help with suffering(Louw et al., 2016).Pain is a strong driving factor that drives the patient's behavioural treatment. For patients with LBP, multiple educational methods are promoted, including biomechanical back school style of education, evidence-based guideline training, cognitive behavioural therapy, and neuroscience education(Louw et al., 2011).

Introduction patient:

The 36-year-old female patient has chronic left side neck pain with numerous complications such as pain neck more at left side than right side, ROM restriction, left side neck palpation trigger pain, and subjective evaluation. The muscle is triggered and muscle stiffness is altered due to heavy work load and continuous standing work. In humans, pain is a normal phenomenon and is required for survival. So, the patient had a drastically different pain response.Rehabilitation concentrated mostly on myofascial release and manual therapy in this study and focused more on pain neuroscience education (PNE).Patient-related education and training is also a value-added interventional feature of patient care and patient education services using a biomechanical model to explain the cause of pain and disability.The existence of a tight band in the muscle and the restriction of the ROM stretch can cause an

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altered trigger. Due to the fact that the body's alarm system remains triggered and stimulated by a much lower level of stimuli, the altered discomfort induced by pain continues after tissue healing, so a much lower degree of movement discomfort causes pain.In this research, we concentrate on enhancing the release of myofascial trigger point, cervical manual therapy focuses more on teaching patients about their pain neuroscience, rather than classifying their pain as due to defective patterns of motion or impaired tissues.

Patient information:

The patient was a 36-year-old woman, housewife, who has suffered more neck pain on the left side than on the right side in the last 3 months but more pain at left side. The pain was marked by a sudden onset, the trigger pain worsened with limitation in her range of motion [ROM], cervical flexion and rotation is painful at left side.Thepatient does not complain of a fall or injuries, but has a history of heavy lifting or heavy items, but during her household work she reported prolonged standing work [more than 9 hours].Due to the pain, she was not able to do any other household work. The patient does not complain of a fall or injuries, but has a history of heavy lifting or heavy items, but during her household work she reported prolonged standing work [more than 9 hours]. The pain was so extreme that she took some inoculation and bedrest for 2 days to avoid her household work and everyday activities and ordered some medicine and rest from her family physician.Her socio-economic status is in the upper middle class. Family members are worried about the pain. Later, after the onset of pain in her left side neck muscle was found, her pain was not diminished by her tender nature. The patient withdrawn all his drugs and visited our (MGM School of physiotherapy rehabilitation and fitness centre Aurangabad, MGM Medical college and Aurangabad Hospital) for further investigation.

The research was approved by the Institutional review at MGM School of physiotherapy Aurangabad and performed after receiving patient consent.

Clinical finding:

On objective examination

The pain evaluation area of current symptoms is more painful onset of neck pain at the left sideis sudden and the pain level of the patient was 8 based on the VAS scale. The essence of pain continues to continue. Although the flexion movement and side rotation are exacerbated. No past history or surgical history.

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Palpating the tenderness of the spinous process over the left side of the neck. In the upper cervical vertebrae area, there is extreme tenderness. There were no complaints from the patient about headache and dizziness.

On test, the range of motion [ROM] was restricted to move left cervical flexion, then the right side and left side rotation are most painful and incomplete, and intervertebral accessory movement was hypomobile on the right side.

Tightness was seen in the levator vertebrae and the upper fibre trapezoid muscle was activated in that area. One of the spontaneous pains in response to movement that can cause local or referred pain is an active trigger, muscle stiffness and a palpable hardening of a taut band of muscle. Jump sign is the characteristics behavioural response to pressure on TrP.

The muscle strength was grade 3+ for cervical flexors and extensors. The distraction test is positive and Spurling's test is negative in other evaluations.

The swelling is not present when observed.

The colour of the skin is natural during examination.

Picture- 1.1 Range of motion assessment [CROM]

Table 1.1- Cervical range of motion

Cervical ROM	Week 1st	Week 3rd
Flexion	**0-38**	**0-50**
Extension	**0-20**	**0-49**

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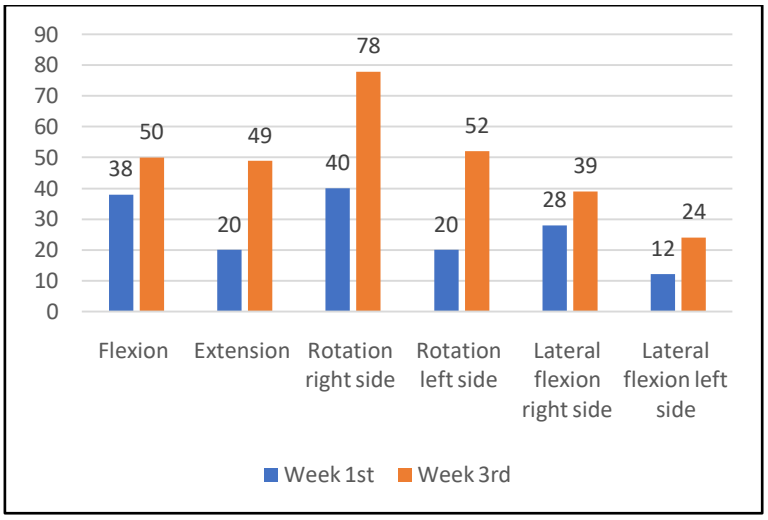
Rotation right side	**0-40**	**0-78**
Rotation left side	**0-20**	**0-52**
Lateral flexion right side	**0-28**	**0-39**
Lateral flexion left side	**0-12**	**0-24**



Graph 1.1- ROM of Cervical 1st week and 3rd week

Graph1.1- The ROM of the cervical on flexion, extension, rotation right side, rotation left side, lateral flexion Rt side, lateral flexion left side, is shown in the following graph.

Diagnosis Assessment

No radiological diagnostic testing was performed.As the patient had no radiological finding she did not face any diagnostic problems.

The gold standard for the diagnosis of Trigger point palpation by''Travell and Simons'' postulated criteria for evaluating trigger point was used. This requires preparation and expertise that are specific. Painful band palpation includes detailed knowledge of muscle anatomy, direction of particular muscle fibresand muscle function. Several basic requirements must be met by the palpation of muscle: taut palpable band,a delightful spot of tenderness in a tight band,patient appreciation by the pressure of the examiner of the latest pain complaint,painful limit on full ROM stretch. And the confirmatory remarksarelocal twitch visual or tactile response, sensation of pain alluded to by compression of the taut band. The diagnosis was based on these criteria and Myofascial Pain Syndrome [MPS] was a confirmed diagnosis.

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Diagnosis

Diagnosis was done on the basis of subjective and objective examination for myofascial pain syndrome [MPS].The treatment for physiotherapy concentrated more on myofascial release, cervical manual therapy and more on pain neuroscience [PNE], and the prognosis of patients was considered great.

Therapeutic intervention-

Earlier she had taken inoculation for pain for neck pain, prescribed by the orthopaedic. She also uses a hot water bag for self-care to avoid discomfort.

Physiotherapy treatment:

Before starting the physiotherapy treatment, we collected the information from the patient about her perspective and knowledge about her pain and current condition. And asked her about her expectation and took her inputs to plan treatment goal for her.

On very 1stday of her treatment session moist pack was used on the upper cervical and left side neck area to reduce muscle guarding. The patient was taught the basic neck Range of motion (ROM) exercises and there after she received neck isometrics exercises 3 sets 10-30sec hold and some basic postural correction exercises with chin tucks. On second day onwards till the end of 1stweek muscle energy techniques (MET) for her left upper trapezius and left levator scapulae muscles with 10 sec hold and relax technique 10 with repetitions performed and additionally transverse glide at lower cervical intervertebral movement (IVM) from non- painful to painful direction glide 10 set given.

In the 2ndto 3rdweek, we started giving her Pain education every alternated day along with the previous treatment which she revived in the 1st week. Pain education consists of a biopsychosocialapproach that demystifies behavioral fears and beliefs about pain and movement, explains how pain is not always involved with tissue damage or degeneration and how biological, psychosocial and cognitive factors influence in pain perception.On her first session of pain science education, she receives a structured lecture with the main points of this approach as: How pain is important to our lives? Pain is a good thing, like an alarm which warns us that something could be wrong. What are the factors that contribute to pain? The importance of psychosocial factors (stress, anxiety,kinesiophobia, etc.) in the pain. The contribution of lack of sleep and physical activity in neck pain, gradual exposure in physical

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activity and daily movements; Neurophysiology of pain. In the other sessions was done the reinforcement of the themes covered in the first session, focusing where individuals have more difficulties to change.

After the treatment sessions are over at the end of 3rd week the patient was given a home programme along with the education regarding lifestyle modifications.A relatively new and promising approach in themanagement of chromic myofascial pain syndrome has focused on teaching people about the neurobiology and neurophysiology of pain,which is referred to as pain neuroscience education(PNE).

Traditionally, manual therapy interventions are thought to be dependent upon bottom-up mediated factors like stimulus intensity, but in recentyears greater attention has been drawn to top-down mediated factorslikethepatient'sexpectations. Bottom-up-mediated factors (left) involve application of manual therapy interventions to the tissues in the context of the environment, whereas top-down-mediated factors (right) involve the patient's thoughts, beliefs, and expectations (cognitions) about their pain experience and the therapy interventions provided.

In a recent case series (Louw et al, 2015), researchers reported that a brief tactile intervention associated withbrain remapping resulted in immediate improvements inpain and spinal flexion range in 16 patients with CLBP.There is growing evidence that PNE can be effective in the management of chronic musculoskeletal pain. The emphasis of PNE is to have patients reconceptualize their pain and to understand that pain and tissue injury are different constructs(Puentedura and Flynn, 2016).

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Picture 1.2- MET for upper trapezius

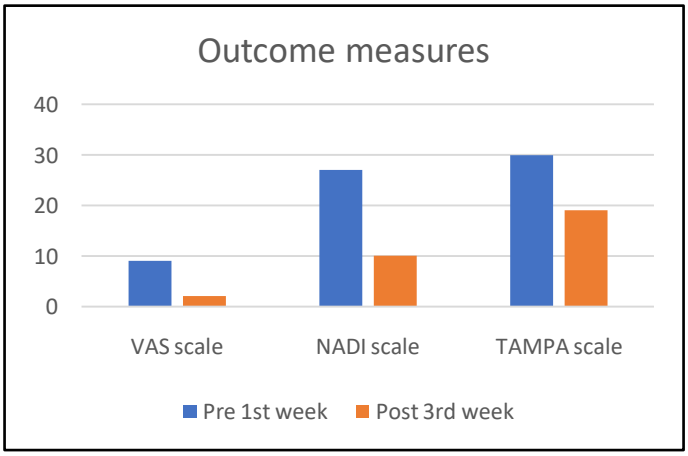
Picture 1.3- Mobilization transverse glide.

Follow-up and outcomes

Outcomes used was VAS scale, Neck disability scale, Tampa scale.

Table- 1.2 Outcome measures pre 1st week and 3rd week.

Outcome measures	Pre 1st week	Post 3rd week
VAS scale	9	2
NADI scale	27	10
TAMPA scale	30	19



Graph 1.2- Outcome measures pre 1st week and post 3rd week.

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In this graph, 1.2 shows that on the scale of VAS, NADI and TAMPA the pre 1st week and post 3rd week.

On daily follow up basis there was immediate on pain VAS scale, effect of manual therapy on reducing ROM and TSK- 11 scale i.e., Tampa scale of kinesiophobia and trigger point release. And there was different between the pre- and post- treatment protocol.

Intervention adherence and tolerability-

The patient conformed very well to number of days of physiotherapy. The patient participated well by focusing on physical therapy and exercises.

Adverse and unanticipated events-

No harmful or unexpected incidents have occurred.

Strength associated with case report-

In addition to minimizing local symptoms, the therapeutic strategy centred on pain, muscle activated, tightness, pain neuroscience education in the patient focuses more on what pain is, the meaning of pain experiences, or optimistic outlook on life. Our primary emphasis is therefore on the patient's experience of pain, the importance of pain thoughts**,** stress management and physical activity. Performed this educational approach.

Weakness associated with case report-

Lack of understanding about pain neuroscience education [PNE].

Discussion-

In our case, myofascial pain was affected by the patient, causing neck pain as a result of strenuous activity. Through precise analysis, it was found that the presence of active trigger point in the muscles of the trapezius area, especially the upper trapezius, caused a tense band, muscle tightness and a decrease in the range of motion.Thus, using myofascial release, muscle energy technique, mobilization, the primary objective of pain neuroscience that involved pain neurophysiology, the meaning of pain thoughts or positive outlook in life.

Recently, Carnero F et al 2020 concluded that dry needling [DN] alone was more effective than controlling usual care [CUC] at 3-month follow-up in reducing chronic non-specific neck pain and discomfort, as per study, with effects on pain neuroscience education and dry needling for the care of patients with chronic myofascial neck pain.However, greater

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improvements have led to the use of PNE in combination with DN.But more emphasis on education in pain neuroscience can decrease kinesio-phobia, pain, anxiety, pain behaviour in response to pain management, physical harm, and medication. To decrease the psychological element, PNE is superior counselling(Valiente-Castrillo et al., 2021). Similarly, in this case, pain neuroscience education in that patient focuses mostly about what pain is involved in the neurophysiology of pain biopsychological model, the understanding of pain perceptions, or positive outlook on life, and we have shown that PNE may minimize kinesio-phobia, pain depression, and pain attitudes about pain management, physical damage, and medications, and psychosocial features.

Mohamed B et al., as researched in 2019(Neveen a. Abdel Raoof and R. Mohamed, 2019), suggested that the immediate effect of posterior anterior-anterior posterior mobilization on pain severity in patients with chronic mechanical neck pain, but that posterior anterior mobilization had the more immediate effect on reducing pain compared to the two separate techniques.Moran IC et al 2015 study(Campa-Moran et al., 2015), the findings included the severity of neck pain measured using a visual analog scale, cervical range of motion and two self-reported (neck injury index and pain catastrophic scale) questionnaires. And the intervention trials have confirmed that they are all successful in reducing the severity of pain. Only in the orthopaedic manual therapy (OMT) group was pain catastrophizing observed. In this case, to improve the range of motion (i.e., flexion, side-bending, and rotation), the mobilization lateral glide and posterior- anterior glide was given to show greater improvement in cervical ROM.

A systematic analysis on the effectiveness of MET in the study of asymptomatic and symptomatic chronic neck pain patients stated by Thomas Evan et al 2019 (Thomas et al., 2019)concluded that MET was successful at reducing pain and improving the range of motion in the participants. In the treatment of upper trapezius trigger points, the Kumar Yatheendra et al 2015 (Kumar et al., 2015) muscle energy technique is superior[15]. In this case, MET was similarly successful in re-establishing reducing pain and range of motion in myofascial pain syndrome patients in this case.

Scientific rationale-

In patients with pain, pain neuroscience education (PNE) is increasingly used as part of the treatment of physical therapy. Pain which persists beyond the normal time of healing in myofascial pain syndrome. On the other hand, the purpose of pain neuroscience education is

to teach patients more about their experience of pain from a biological and physiological perspective.

Pain is a human experience that is natural and necessary for life. Living with extreme pain and distress after finding treatment. In the past of humanity, this help-seeking activity is well known. So, PNE is much superior in minimizing pain compared to education alone, accompanied with either exercise or manual therapy. To our knowledge when combined with effective movement-based methods, comprehension of pain experiences, or optimistic outlook on life, pain neuroscience education has a potential. Therefore, understand pain, recognize benefit.

Patient perspective-

Patient viewpoint shared that she is so distressed psychologically affected on day 1 on neck pain 8 on VAS and found her neck trigger then the patient pain is 2 on VAS scale and pain biopsychological model compared to 3rd week, the comprehension of pain experiences, or positive attitude. As such, the perception of pain is well established.

Author's Contribution: All authors contributed equally to the case report.

Conflict of Interest: The authors declare no conflict of interest.

Acknowledgement: We thank the patient who participated and contributed to the study.

Informed Consent: Written & Oral informed consent was obtained from patient included in the study.

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