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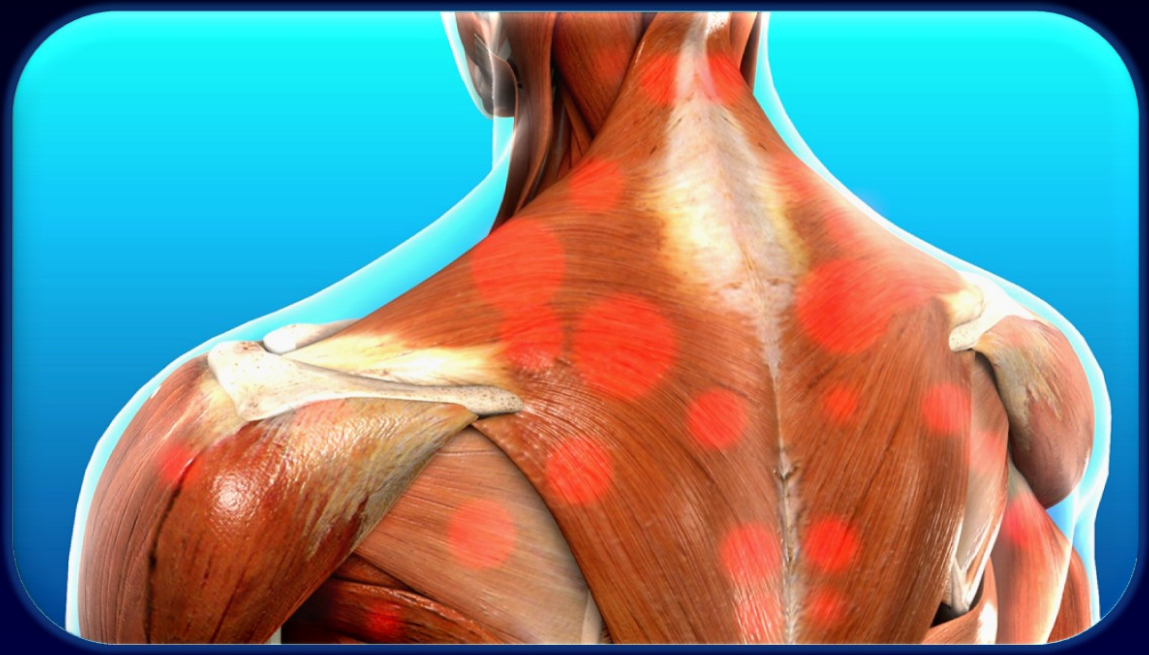

# *From the editor's desk*

**Dr. Ravi Sankaran**
Associate Professor
Amrita Institute of Medical Sciences, Kochi

We live in challenging times as the Corona virus pandemic continues. Speaking of challenges our Secretary has issued a challenge. 'The KJPMR must be indexed!'. 'The journey of a thousand miles begins with one step'(1). The road ahead will be challenging. In order start one should know where they stand. The article 'Journal versus Bulletin: Worth the headache?' addresses this in our Professional section. Indexing services are stringent. Our first baby step is to focus on obtaining content. This means more editorials and research.

This release's new contents are 'Scales', and the 'Invited author'. Scales will help everyone get on board with what to use, validation etc… The 'Invited author' will present a critical analysis of the literature regarding a specific topic of their choice in concordance with the issue's theme. As we are not indexed currently, the same paper could then be published in any indexed journal. And so step by step we move closer to the goal.

Our Invited Authors for this issue are Dr Sudheera and Dr Nitin A Menon. Both have given us excellent reading material. Dr Shibi and I have brought 'Cold calls'. Dr Roshin has given us her 'Expert opinion'. Future authors please use these articles as a guide when you write for KJPMR. These doctors have set the standard.

Quarterly issues are themed as, Musculoskeletal, Neurological, General, and Specialty with subtopics per Braddom chapters. Having personally invited all of our 160+ Whatsapp listed PMR doctors, 70 responded favorably choosing topics, 22 declined to support the journal and 63 didn't respond to five reminders, allotted topics, or offers of support.

With respect to the 'Research is fun' section, it is a work in progress. When our ethics board resumes I will present it. I'm blessed that Dr Unnikrishnan from TVM has offered to help. As we get this scrappy section into shape we hope the number of contributions will increase. I have an ulterior motive. If everyone contributes we can start doing Quality of Life studies in our population. This will project our field further especially on the government/ political front.

Next quarter's topic is Spinal Cord Injury. I will be sending a survey regarding Spinal Cord Rehabilitation to each of you. Please respond. Much praise was voiced about previous journal aesthetics. We have to thank the Amrita Graphics Department for this, but Corona has shut them down. I personally owe thanks to Dr George Joseph, Dr Nittu Panjikaran, and the PGs in AIMS PMR for reading the content I contribute. In closing our journal is eco-friendly. If you want a hard copy print it, otherwise spare mother earth.

Dr Ravi Sankaran

(1) Lao Tzu ,https://www.brainyquote.com/quotes/lao_tzu_137141

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CLINICIAN

# Myofascial Pain - Review of Diagnosis and Treatment

**Dr Nitin A Menon** MD (PMR)
Consultant Dept of PMR, Rajagiri Hospital, Aluva, Kerala

**Abstract:**

Myofascial pain syndrome (MPS) is a common condition necessitating a visit to any pain physician. In this condition, pain mainly originates in muscles and soft tissue and can result in loss of range of motion and resultant inability to carry out desired functions. There is no set of diagnostic criteria or objective measurement to confirm the diagnosis. Since several other conditions may prove close mimics, more clarity regarding diagnostic tests is a need of the hour.

Moreover, a myriad of treatment options exists. This can prove confusing to the inexperienced physician in terms of what to choose and when. With this review, we aim to look at the existing evidence and help in reaching an assured diagnosis and provide answers which may guide in choosing the correct treatment options.

**Keywords:**

Myofascial pain syndrome, trigger points, pain management

**Introduction:**

Myofascial pain syndrome (MPS) is a non-articular musculoskeletal pain disorder characterized by contracted bands of skeletal muscles that contain discrete painful nodules called trigger points which seem to be the originator of the pain response. [1] Trigger points (TP), tender spots (TS) and taut band (TB) all seem to be cited interchangeably in reports describing MPS. TP is small and sensitive areas in a muscle that spontaneously or upon compression

cause pain to a distant region is known as "referred zone"." In contrast, TS cause pain only locally upon compression and TB are groups of muscle fibres that are "hard" on palpation. [2] Prevalence of this condition is reported to be from 20% in a general orthopaedic clinic to as high as 93% in speciality pain clinics. [3] TP can be active or latent. A latent TP is that which is elicitable only by palpation. In contrast, active TP remains spontaneously painful.

The causative factor for the generation of TP is unknown, but many factors may have a role to play. Unusual muscle activity patterns – perhaps as a result of faulty ergonomics like sleeping posture or prolonged use of mobile phones or computer screens are believed to generate abnormal contractile forces in certain muscle groups of the head, neck and arm. [4] Such sustained contraction leads to the generation of reactive oxygen species in the mitochondria of contracting muscles. This sets up a positive loop feedback mechanism. This in turn activates microtubule formation. This facilitates calcium entry inside the muscle cell to sustain hypercontractile activity. [5] Psychological conditions like anxiety, depression or lack of sleep may further exacerbate the pain response. State-anxiety, which is anxiety related to a certain stimulus may morph into trait-anxiety, the tendency to remain in an anxious, hyper-arousable state which may reduce descending pain modulatory signals leading to maintenance of pain and potential loss of therapeutic effect by drugs which work on the descending modulatory system. [6]

Diagnosis of MPS is based mainly on examination of TP with a suggestive history of pain attributable to such a trigger point. No confirmatory laboratory test exists. Ever since Travell and Simons championed the existence of such a condition, their criteria are being followed by most researchers and

clinicians. [7] However, some workers have refuted TP as a cause for MPS. They have argued that studies have failed to demonstrate consensus in clinical diagnostic criteria, muscle histology has not been able to demonstrate changes commiserate with any TB, and the lack of standard therapies have lent credence to the fact that a single mechanism may not be at play in the generation and maintenance of this condition. [8] They have not refuted the presence of TP, merely iterated that TP may not necessarily explain the whole condition. A plethora of treatments ranging from physical therapies, psychological strategies, medications – oral and topical, needle trigger point release and local injections are available with no clarity on effectiveness and relative efficacy of one over the other.

With this background, we proposed to study the available literature to answer the following questions:

1. What clinical or laboratory criteria may satisfy the diagnosis of this condition?

2. What are the treatments available, and what is their effect on the condition?

3. Is there any treatment which may be recommended as superior to any?

**Methods:**

We searched medical databases like Pubmed, Embase, Cochrane, Trips and NICE guidelines with the keyword as “myofascial pain syndrome”. Recent articles were given priority over older ones. If other conditions like fibromyalgia or widespread chronic pain were included, such articles were discarded. Only full-text articles in English were considered for review. Editorials, comments, letters to the editor were not included in the review.

Confounding conditions like temporomandibular pain, migraine which may have a component of myofascial pain but are essentially separate entities were also excluded from the review.

Results:

We narrowed down 19 full-text articles meeting our criteria. They were categorized according to articles pertaining to diagnosis and those pertaining to treatment. The summary of our findings pertaining to diagnosis and treatment is presented in table 1& table 2, respectively.

TABLE 1: Summary of findings regarding diagnosis of MFP

| Study/Author Name | Criteria for diagnosis | Brief findings |
|---|---|---|
| Mayoral del Moral [9] | Clinical examination (Single blinded randomised study) | 2 examiners, one of whom was blinded, exhibited very good interrater reliability for diagnosis of MPS exhibiting presence of TP (k=1.0) and identification of muscles leading to diagnosis (k=0.81) |
| Fernandez-de-las-Penas [10] | Delphi Questionnaire (Expert Consensus) | 70% of 65 international experts endorsed a taut band (93%) a hypersensitive spot (76.5%) and referred pain (71.5%) as essential criteria for TP |
| Rivers [11] | International survey | 214 responses identified tender spots that recreated symptoms when palpated as essential for diagnosis of MPS. |
| Ballyns [12] | Sonoelastography in a group of 44 subjects meeting clinical criteria | Active TP had larger areas under sonoelastography as compared to latent TP or normal sites. Analysis of ROC curves showed active, latent and normal sites could be distinguished from each other (ROC 0.9, 0.8, 0.8) Doppler waveforms showed higher pulsatility for vessels near TP (8.3 vs 3.0) |

ROC = Receiver operating characteristic

TABLE 2: - Summary of findings regarding treatment in MFP

| Trial/Author Name | Intervention | Assessment Tools | Result |
|---|---|---|---|
| Kim [13] | NSAID patch with NSAID plus TENS with NSAID plus heating pad with NSAID plus capsaicin (RCT) | NRS for pain | No difference |
| Hsieh [14] | Diclofenac patch vs Control (RCT) | NRS for pain<br>Range of motion<br>Neck Disability Index | Significant difference ($p< 0.05$) |
| Romero [15] | 8% Capsaicin cream vs placebo (RCT) | Pain score | Significant difference at day 60 ($p < 0.0001$) |
| Ketenci [16] | Topical vs injectable vs topical plus injectable thiocolchicoside(RCT) | Pain scores at 1, 3, 5 days | Significant difference |
| Kavadar [17] | Conventional ultrasound therapy for 15 days vs placebo ultrasound (RCT) | VAS score<br>0-5 score<br>Beck's depression inventory<br>Pressure pain threshold | Significant difference at 3 months<br>$p < 0.01$to $p < 0.001$ |
| Garcia-Espinoza [18] | Whole body cryotherapy for 20 sessions (Single arm study) | Pain Scores<br>Pain Threshold | $p< 0.001$<br>$p< 0.001$ |
| Ahmed [19] | Aerobic Exercises in warm pool for 60 minutes for 4 weeks (Review article) | Pain Scores<br>Pain threshold<br>TP | Significant change in all outcomes |
| Ramon [20] | Focused and radial ESWT (Review article) | VAS scores<br>Comparison with TENS and TP injection | Significant difference reported |
| Kim [21] | UST vs Self-exercises for 2 sessions for 4 weeks (Single blind RCT) | VAS scores<br>PPT<br>ROM | No difference reported |
| Arguisuelas [22] | Myofascial release vs sham release (RCT) | Erector Spinae EMG<br>Pain scores<br>Disability scores | Significant difference noted in MFR group |

TABLE 2: - Summary of findings regarding treatment in MFP (continued)

| Trial/Author Name | Intervention | Assessment Tools | Result |
|---|---|---|---|
| Li [24] | Various acupuncture techniques, dry needling or TP injections versus sham dry needling (Meta-analysis) | Pain scores (VAS or NRS)<br>PPT<br>Adverse effects | Significant difference in pain scores ranging from -3.6 with SWAM to -1.3 with MSN<br>Significant difference with DN, MDIMST, TP Inj with Lig, Laser for PPT |
| Lugo [25] | TP inj with Lig vs PT vs PT with TP inj (RCT) | Pain scores<br>ROM improvement<br>QOL and depression scores | No significant difference at one and 3 months |
| Roldan [26] | Lig+ Triamcinolone vs Normal Saline TP inj in ER (RCT) | Pain Scores | No significant difference at 2 weeks |

RCT = Randomised controlled trial, NRS = Numeric Rating Scale, VAS = Visual Analogue Scale, QOL = Quality of life, ROM = Range of motion, EMG = Electromyography, MDIMST = Multiple deep intramuscular stimulation therapy, Lig = Lignocaine, Bup = Bupivacaine, Inj = Injection

**Discussion:**

The two main points of review are diagnosis and treatment.

**Diagnosis:**

Clinical history and elicitation of TP seem to be the essential components of the diagnosis of MPS. A study design compared interrater reliability between 2 examiners with subjects having at least one TP in neck and scapular muscles demonstrated very good interrater reliability.

(Kappa (k) value 1.0 for diagnosis of MPS and 0.81 for identification of muscles with TP) The study design involved two groups of 20 patients in each group who were matched at baseline. A significant difference was observed in both groups in terms of  of painful passive range of motion restriction, limitation of muscle strength due to pain, jump sign, pain referral patterns, pressure pain threshold and skin rolling test positivity. ($p< 0.0001$) Interestingly, the p-value for the presence of a taut band was least between the two groups. ($p=0.09$) Interrater reliability was best for superficial muscles like supraspinatus and deltoid ($k=1.0$) and least for deep muscles like splenius capitis ($k=0.55$) [9]

The criterion for TP itself has little consensus. A Delphi panel comprising international experts identified a cluster of three diagnostic criteria for identification of TP, namely, taut band, hypersensitive spot and referred pain. It was recommended by the panel that at least 2 of the three criteria should be present for the diagnosis of TP. Whether the presence of TP is the only criteria for the diagnosis of MPS was not confirmed in the study. Approximately 78.5% of the experts also affirmed that referred pain elicited by a TP could include different sensory sensations and not just pain. They suggested using the term “referred sensations” rather than “referred pain” for characterizing sensory phenomenon elicited by palpation of a TP. [10] A survey of 214 responses among members of International Association for Study of Pain and American Academy of Pain Medicine elicited more than 70% positive response for presence of MPS as a distinct entity and tender spot-causing pain (72%) and reproduction of symptoms on palpation of the tender spot (58%) as essential for diagnosis. No symptom or response to treatment was considered as essential to diagnosis. There was a general agreement that imaging and other tests were needed to rule out other conditions than supporting a diagnosis of MPS. [11] Both studies had a wide variety

of disagreement with regard to other clinical criteria for the diagnosis of MPS.

Imaging studies like ultrasound or magnetic resonance imaging are sometimes used for objective diagnosis. A study conducted in 44 subjects on a sonographic picture of TP previously confirmed clinically in trapezius muscle revealed the presence of TP as focal hypoechoic areas with heterogeneous echotexture. Vibration elastography was able to measure the TP size and quantify it as active, latent or normal. It was also able to describe the complex surrounding environment in terms of tissue blood flow changes. [12] This method may potentially be useful for making a confirmatory diagnosis in experienced hands.

Some of the drawbacks were that the study did not specifically exclude patients with fibromyalgia or whiplash, included only a single superficial muscle and didn't have any controls. Moreover, access to ultrasound devices and expertise in their use is still not widespread.

**Pharmacologic treatments:**

We could not find any studies which used oral or injectable non-steroidal anti-inflammatories (NSAID) or opioid medications for MFP. However, topical NSAID in the form of patches seems to have been studied by some researchers. A study reported the outcomes in ninety-nine patients who were randomized to NSAID alone (25) NSAID plus transcutaneous electric nerve stimulation (TENS) (24) NSAID plus heating pad (25) and NSAID plus capsaicin ointment (25) At the end of 2 weeks, there was no difference between any of the groups in terms of pain scores, range of motion or disability scores. However, using ANCOVA models, the NSAID plus capsaicin group showed slightly significant difference at 14 days ($p = 0.057$) [13] However, topical treatments may only work for superficial muscles and 14 days is too less a period since most patients

patients with MPS are chronic sufferers. A similarly designed study on 153 patients comparing diclofenac patch with control showed significantly improved scores for pain (VAS), range of motion of neck and neck disability index ($p < 0.05$) [14]

Romero and others [15] randomized two groups of 20 patients each to receive a single placebo and capsaicin (8%) topical application, respectively. At 7, 30 and 60 days the capsaicin group showed significantly lower scores as compared to the placebo group (5.7 vs 0.7 at seven days, 7.8 vs 1.1 at 30 days and 8.8 vs 3.8 at 60 days). Topical capsaicin thus appears to be a promising intervention in the short and medium-term. However, such high concentrations are not commonly available in commercial preparations. Moreover, the authors reported the presence of burning sensation at the site of drug application for 24 hours which might reduce the acceptability of this drug among patients. Toxicity profile of high dose capsaicin is not known; neither does the drug have an antidote.

Thiocolchicoside is a muscle relaxant available in oral, injectable and topical form. A study performed to compare the topical and injectable form among three randomized groups with MPS reported decreased VAS scores in the topical group right from day one which was maintained till day 5. ($p = 0.006$ to $0.001$) for injectable ($p = 0.057$ to $0.001$) and injectable plus topical group ($p = 0.117$ to $0.001$) improvement started around the second day and was maintained till day 5. Increase in neck lateral range was also observed in all three groups though most impressively in the topical group ($p = 0.001$ vs $0.019$ vs $0.009$). Measurement of pain threshold using algometer did not show any difference among all three groups. [16] This might demonstrate the effectiveness of topical muscle relaxant over injectable form, even though objective data for pain measurement in

the form of algometer measurements did not show any significant benefit among all three groups.

**Physical Modalities:**

A number of therapeutic modalities – both heating and cooling have been prescribed to patients as a part of the management of MPS. Ultrasound therapy (UST) is one of the most common physical modalities used due to its thermal and non-thermal properties as well as the ability to penetrate deeper structures. A study involving 59 patients were randomized to two groups to receive conventional UST for 6 minutes for 15 sessions and placebo UST, respectively. Immediately after treatment as well as at the end of 3 months, a significant decrease in pain scores, objective pain analysis in terms of 0-5 scores, depression scores and improvement in pain tolerance was obtained with UST. No additional therapy was reported to be needed. [17] Generally UST alone is known to show modest improvement and lasting effects are seldom observed unless coupled with other treatments like stretching, ergonomic modifications, medications or some form of psychological counselling.

Whole-body cryotherapy was given to 20 subjects who met the clinical criteria for MPS ( 20 sessions of 4 sessions in 5 weeks) The subjects showed a significant difference in pain scores (7 at baseline, 4.4 at the end of session 1 and 1.4 at the end of session 20) and algometry from session 1 (1.43 at baseline, 1.78 at the end of session 1 and 2.70 at the end of session 20) and significant difference from baseline from session 6 for both scores ($p < 0.001$) Pro-inflammatory cytokines showed no difference before and after the intervention [18] Drawbacks of the study are significant. Whole-body cryotherapy, which involves immersing in an ice bath, is not tolerated well by many patients. Since there is no control group, effects cannot be compared and

persistence beyond the study period was also not studied.

Aerobic exercises performed in a warm pool for one hour three times a week for eight weeks were administered to patients who had undergone breast cancer treatment and met criteria for MPS. Exercises included stretches, low-intensity endurance and core exercises and cooled down stretches and relaxation exercises. The authors reported a reduction in VAS score, improvement in pressure pain threshold and reduction in TP post-intervention. [19] However, this may not constitute a true aerobic program since no aerobic training measures like heart rate achieved or VO2 max has been included in the report.

A review article reported on the benefits of extracorporeal shock wave therapy (ESWT) in MPS. They recommended low or medium energy settings depending on the area and depth of treatment.

1. Focused ESWT: 1000-2000 pulses, 4 Hz, 0.05-0.35 mJ/mm2, 1-3 sessions
2. Radial ESWT: 1000 pulses, 1-1.5 bar (medium muscles) 1.5-2 bar (large muscles), 6-10 Hz, 3-5 sessions for 1 week with follow-up sessions at 6 weeks, 3, 6 and 12 months.

It was posited that ESWT might help in MPS by increasing perfusion, promoting angiogenesis and alter pain signalling in ischemic muscle tissues. The authors also reported that ESWT was as effective as TENS and TP injections in pain score reduction. [20] All sessions were coupled with a supervised exercise program. ESWT seems to be having a role in pain management of soft tissue conditions which do not respond to initial treatment methods.

Self exercises like stretching seem to help in MPS. A single-blinded study of 40 elderly individuals (more than 60 years of age) meeting the criteria for clinical

diagnosis of MPS were randomized to UST and self-exercise with a therapeutic ball (2 sessions weekly for four weeks) Both groups showed no difference in outcomes for VAS scores, pressure pain threshold (PPT) and range of motion at 1,2,3,4 weeks. [21] This may be evidence to recommend self-treatment in certain groups – especially elderly individuals who often report difficulty in coming for regular application of therapeutic modality. As in most cases, four weeks duration of treatment may not be sufficient in chronic sufferers. A specific age group of patients selected in this study might mean that extrapolation to other populations may not be possible.

Myofascial release (MFR) which involves the application of low-load long-duration stretch to the myofascial complex is a commonly used manual therapy to release trigger points, reduce pain and improve the range of motion of affected muscles. A randomized study performed on 36 individuals with non-specific back pain and divided into two groups – one receiving MFR (4 sessions two times per week for two weeks) and other sham treatment reported improved pain scores (9.1 points on McGill pain questionnaire) and reduced disability from back pain (5.6 points on the Roland-Morris questionnaire) They also reported reduced EMG signalling of the back extensors during flexion manoeuvre thus giving objective evidence of normalization of spinal extensor co-contraction-relaxation with spinal flexion. [22] This study is attractive because it shows evidence of reduction of pain arising from deeper musculature. However, no criteria appear to have been used to reach the diagnosis of myofascial pain in these subjects.

**Invasive Measures:**

Dry needling of TP is a popular invasive option offered to patients with MPS. Review studies have reported that dry needling may have benefit in pain reduction in such patients beyond the

placebo effect. Though most authors report short term effects, long-term pain reduction has also been known to occur. In comparison to superficial needling, deeper needling seems to be more effective, especially if combined with needling the paraspinal muscles supplying the same segment as the affected muscles with TP. [23] A meta-analysis of 33 randomized controlled trials with 1692 patients having undergone 22 kinds of interventions suggested that compared with placebo-sham acupuncture, scraping combined with warming acupuncture and moxibustion (SWAM) was most effective in reducing pain intensity, mini-scalpel needle (MSN) was more effective in increasing PPT, and TP injection with bupivacaine had the most risk of adverse events. Dry needling (DN) and TP injection with local anaesthetic had moderate effects for all outcomes though these are the most commonly performed interventions. [24] The choice of therapy is difficult to make because care-provider expertise and experience play an important role as well as a patient's willingness to undergo the said therapy. Also, the number of sessions was not standardized for each intervention and hence the effect of a larger number of sessions cannot be commented upon.

TP injections either with local anaesthetic medications, steroid preparations of botulinum toxin are often used as interventional tools for pain reduction and gain of lost range of motion. They are mostly opted by both physicians and patients as a quick fix to reduce pain and discomfort, especially if initial measures do not work as well as anticipated. Researchers have compared the effect of physical therapy, lignocaine injections and combination of the two and reported no significant difference between the three measures in terms of reduction of pain using VAS at one month and three months post-intervention. They also did not report any improvement in range of motion, quality of life or depression scores at three months. [25]This is not

surprising, and long-term effects tend to even out between most interventions. Immediate outcomes are generally more favourable towards TP injections (which was not reported in this study) and may be offered to patients who present with severe pain and unable to perform therapy or have difficulty in day to day activities or sleep. In patients presenting to the emergency department with MPS, an RCT was conducted in 2 groups one of which received TP injection with an active drug (Lignocaine with Triamcinolone) and the other with normal saline and both groups reported similar outcomes with respect to pain scores immediately which persisted over a 2-week period. [26] Normal saline may be a safer option in patients with extensive co-morbid conditions. Certain subjects might exhibit an extremely hyperirritable response to touch, which may make injection therapy difficult. In such cases, a lignocaine patch has proven to be as effective as bupivacaine injection in the reduction of pain – both provoked and spontaneous, and significantly better than placebo patch when used up to 9 days. [27]

Botulinum toxin (BTX) injection seems to be finding favour in the treatment of MPS. A COCHRANE review identified 4 RCT reporting comparison of BTX with placebo or local anaesthetic injections. 2 studies found a statistically non-significant difference between the two groups favouring BTX for pain scores (both evoked and spontaneous) reduction and one study found no difference. There was no difference reported in PPT in any of the studies. However, one study reported a significant difference in the duration of daily pain favouring BTX. There was no significant difference in QOL, ROM or adverse effects except one study which reported significantly more adverse effects for BTX like muscle soreness. [28] Based on this review, BTX can be recommended at best as a secondary treatment in case other measures fail to elicit the desired response. In our set-up,

high costs remain an issue while opting for this treatment.

**Conclusion:**

MPS is a painful condition of the musculoskeletal system commonly seen by medical providers. Diagnosis mainly rests on clinical history and elicitation of TP in the affected muscle, which may reproduce pain or some distant somatosensory symptoms, not necessarily in any characteristic pattern. Certain modes of ultrasound examination may provide supporting evidence for diagnosis. Treatment usually comprises physical therapy – including exercises, self-management and modalities. Topical applications of NSAID or muscle relaxants are useful in the initial management. Interventions include dry needling, various acupuncture techniques, local injections with saline or local anaesthetics and botulinum toxin. The superiority of any one measure cannot be proven, and most patients are likely to require a combination of therapeutic measures.

**Limitations:**

1. This is a single-author review – the risk of bias in selecting study cannot be ruled out
2. The conclusions are primarily applicable only to conventional MPS. MPS which can be a part of many other conditions – like oro-facial pain, migraine, pelvic pain syndrome, cancer may not necessarily be addressed in this review.
3. Most studies did not meet long term follow up criteria, and hence the applicability of these recommendations to chronic MPS conditions may not necessarily be backed by the evidence presented here.

**Further Areas of Research:**

Use of oral medications for pain relief or various muscle relaxants can be compared with different invasive and non-invasive measures to prove superiority or

non-superiority. Optimal duration of treatments and pain relief targets where treatment may be stopped, and self-treatment started in also not known. Effect of counselling on pain experience in MPS is also a potential subject for study.

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# Myofascial Pain Quiz #1: Test your might

1. The complex interaction between the initial stimulus of tissue injury & the subjective experience of nociception & acute & chronic pain can be described by four processes which are:-

   (a) Transduction, transversion, modulation, perception

   (b) Transduction, transmission, modulation, perception

   (c) Transmission, conduction, perception, attenuation

   (d) Transduction, attenuation, modulation, perception

2. The conversion of one form of energy(thermal, mechanical or chemical stimulus) is converted electrochemically into nerve impulses (action potentials) in primary afferents is called:-

   (a)Transmission (b) Modulation

   (c) Perception (d) Transduction

3. The two broad categories of C fibres are:-

   (a)Peptidergic&Isolectin B4 binding (b) C1 & C2

   (c) Inducible & Housekeeping (d) Ca &Cb

4 The nerve fibers associated with persistent painful sensations are:-

   (a)Type 1 A delta & nociceptive C fibers (b) Type A gamma & B fibers

   (c) Type A beta & nociceptive C fibers (d) Type B & nociceptive C fibers

5. With peripheral & central neuroplastic changes in _____ fibers, innocuous stimuli might be perceived as painful, resulting in allodynia.

(a)C fibers (b) B fibers (c) A beta (d) A delta

6. ____ nociceptors respond to intense mechanical & temperature stimuli, & with sensitization contribute to the process called hyperpathia, in which noxious stimuli become frankly more painful & the pain perception can last longer, even after the initial stimulus is removed.

(a)A beta ( b) C fibers (c) A delta (d) A gamma

7. A delta & C fibers convey nociceptive information primarily to _____ of the Dorsal horn.

(a) Superficial laminae(I & II) & Deep laminae(V & VI (b) Superficial lamina II

(c) Deep laminae (III to VI) (d) Deep lamina IV

8. The lateral pain system, as described by Melzack&Chasey, is also called...?

(a) Paleospinothalamic system (b) Spinolimbic system

(c) Spinoreticular system (d) Neospinothalamic system

9. The autonomic markers associated with visceral pain are....

(a) Bradycardia & hypotension (b) Tachycardia & hypertension

(c) Tachycardia & hypotension (d) Bradycardia & hypertension

10. The IASP classifies_____ types of pain treatment programs.....

(a) Three (b) Two (c) Five (d) Four

# Work-related musculoskeletal disorders among physicians and surgeons

**Dr Sudhira ,**Consultant Physiatrist, MMCH

Doctors are exposed to a range of work-related risk factors. This leads to various occupational diseases. Musculoskeletal disorders (MSDs) are the commonest. We studied MSDs in a group of physicians, surgeons and dental surgeons and found the incidence to be 20%, 37%, and 61% respectively (1). The operating position was a significant contributing factor. Sitting position was frequently adopted by physicians and they suffered neck and low back pains. Standing position was frequently adopted by surgeons and they suffered low back hip and knee pain. Dental surgeons commonly consulted in sitting positions in dental chairs and they suffered from neck pain, elbow, low back, hip and knee pain. (2)

MSD's are injuries or pain in the human musculoskeletal system including joints, muscles, nerves, tendons, ligaments, and structures that support limb neck and back. They can be acute or repetitive strain injury and reflect as neck pain, back pain, shoulder pain, pain in the limbs, wrist pain, myofascial dysfunction syndrome, atypical facial pain. Underlying disorders range from degenerative diseases of the cervical and lumbar spine, knee and ankle to repetitive overuse disorders like de Quervain's tenosynovitis, medial and lateral epicondylitis, Achilles tendonitis, plantar fasciitis. Rotator cuff pathology, carpal tunnel syndrome atypical wrist and hand pains were also incriminated. MSDs have physical, psychological, social, and economic impact on doctors since they directly affect working capacity which leads to absenteeism and early retirement. (2)

As is true for all diseases, prevention is better than cure. Prolonged static postures, repetitive movements, sub-optimal lighting,

poor positioning, genetic pre-disposition mental stress, and physical conditioning are incriminated in the development of MSDs. Ergonomics favors physicians and hence the prevalence of MSDs among physicians is comparable to prevalence in the general population. However, surgeons and dental surgeons are more prone to developing MSDs as they adhere less to ergonomics. Specific factors affecting surgeons are lack of planning, physical demands of surgery, time constraints, inadequate OT facilities, cramped awkward postures, poor lighting, incorrect monitors, equipment positioning, static repetitive movements, type of surgery, challenges with instrument design, assistant. Interestingly female surgeons were more affected due to shorter stature, reduced upper body strength and surgical instruments designed for the larger male hand. In dentistry adhering to ergonomics is further compounded by limited access to operating area and use of the dental chair leading to the adoption of complex body postures besides improper lighting and magnification. Physicians, on the other hand, fared better due to comfortable working conditions and better ergonomic postures. The demons threatening physicians are increased causalities, increased working hours, continuous patient care and pressure of work leading to stress. (3)

By closely observing the work and MSDs of my colleagues I found a stark contrast between the scientific treatment of MSDs and how doctors treat themselves. The majority of them used NSAIDS steroids and ointments whereas prevention is the key to MSD treatment. From a few studies available there is evidence that ergonomic programs not reduce the risk of neck pain. Exercise programs especially stretching exercises reduced new episode of neck pain Exercise can be done as a warm-up exercise before duty or at least once in a day.(4) Aerobic programs including body awareness and aerobic, strengthening, stabilizing, and stretching exercise supplemented by health information/stress management training is

necessary

Studies have revealed that regardless of intensity, volume, and type of exercise, antioxidant parameters seem to increase and pro-oxidant indicators decrease after an exercise program.(5, 6, 7) Improvement of physical fitness, oxygen consumption, body composition, lipid profile and fasting blood glucose control can be attained, hence age-related musculoskeletal disorder can be controlled to a great extent Exercise program counteracts the deleterious effect of aging not only by competing for the major trigger but also by exerting additional antioxidant action (8)

We advise all doctors to identify MSDs and treat them early since they are akin to termites slowly eroding our health and finally our profession itself. Do not hesitate to consult, investigate properly, accept the advice of your consultant and take proper treatment. Use fewer drugs and adopt physical measures like exercise heat application. Ensure sufficient rest, regular exercise and be proactive in identifying risk factors and overcoming them.

Let me conclude with these words. Dear Colleagues we doctors are prone to develop MSDs. This does not threaten life but invariably prevents us from enjoying our professional and personal life. Only a physically and mentally healthy doctor can inspire confidence in patients and rehabilitate them effectively.

Broadly speaking four strategies are utilized in tandem to avoid aches and pains.

1. Planning and scheduling work be it outpatient or operation theatre. This avoids stress.
2. Ergonomics or fitting the workplace to the worker. This involves investing in precise instrumentation tools and implants and modifying the environment including consulting chairs to suit the doctor's physique and professional needs. Posture related MSDs can thus be prevented.
3. Employing skilled assistants who are effective and supportive. A skilled assistant is a direct aid to the physician or

surgeon allowing him to focus on highly technical procedures. Effective SA is attentive efficient positive and is good communicators.

4. Maintaining a healthy lifestyle including adequate rest, regular exercise and appropriate dietary habits. A sound mind in a sound body is the motto.

1. Regular exercising: stretching exercise and strengthening exercise or aerobic according to the convenience

2. Complete daily activities in safe ways

3. Maintain good posture

4. Be careful when lifting heavy objects

5. Try to keep repetitive movements to a minimum

6. Maintenance of ideal body weight

a) This can be done by controlling the diet, engaging in adequate physical activities

b) Group activities.

7. Planning a break in between patients.

8. Strictly avoiding smoking and alcohol consumption if any.

9. To have a healthy lifestyle.

10. Awareness of biomechanics

11. Stretching, aerobic and stabilizing exercise and pain-relieving modality like HEAT, TENS, IFT is necessary

12. Chronic and repetitive processes cause MSD in surgeons. Robotic surgery is a good alternative to usual surgical procedure.

(6,7,8)

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# Myofascial Pain Quiz #2: Are you ready ?

1) "Increased sensitivity to stimulation, excluding the special senses is....._____?

(a) Hyperalgesia (b) Paresthesia (c) Hyperesthesia (d) Dysesthesia

2) Using High Resolution MRI, the following change is noted in the CNS in patients with chronic low back pain..?

(a)White matter hypertrophy (b) White matter atrophy

(c) Gray matter hypertrophy (d) Gray matter atrophy

3.) In chronic or persistent pain the characteristic processes playing the pivotal role are..?

(a)Transduction, transmission (b) Modulation, perception

(c) Transduction, modulation (d) Perception, transmission

4.) Which class of nerve fibers serve the motor function of being the preganglionic & postganglionic autonomic fibers?

(a)B & C respectively (b) A alpha & C respectively

(a)(c) A beta & B respectively (d) A gamma & A delta respectively

5.) A complex set of activation-dependent posttranslational changes occurring at the dorsal horn, brainstem, & higher cerebral sites is termed..?

(a) Attenuation (b) Central sensitization

(c) Peripheral sensitization (d) Transduction

6.) Sleep comprises alternating REM & NREM states that cycle at an ultradian rhythm of approximately____ minutes.

(a) 120 minutes (b) 60 minutes (c) 30 minutes (d) 90 minutes

7.) According to Farrar et al., while using the numeric rating scale, a reduction of ap proximately __% represents clinically important pain relief
(the least reduction needed)

(a) 40% (b) 30% (c) 20% (d) 60%

8.) Meloxicam has a half-life of_____

(a) 9-10 hrs (b) 2-4 hrs (c) 7-9 hrs (d) 15-20 hrs

9.) Which of the NSAIDs given below does not belong to the class of Acetic acid derivatives?

(a) Etodolac (b) Naproxen (c) Ketorolac (d) Diclofenac

10.) The three receptor types to which opioids bind are _____

(a) Alpha, Kappa, Lambda (b) Delta, Gamma, Theta

(c) Mu, Delta, Kappa (d) Theta, Gamma

COLD CALL

# Myofascial pain syndrome: A Review

**Dr Shiby T G**, Assoc Prof, Govt Medical College, Thrissur

Most people must have experienced muscle pain at some point of time which typically resolves by itself within a matter of few weeks .Myofascial pain syndrome (MFPS) is described as sensory, motor and autonomic symptoms originating from hyperirritable spots located in a taut band within a muscle or fascia. The spot is tender, gives rise to referred pain and muscle dysfunction.(1)This is the most common cause of chronic head &neck pain,(54.6%) and back pain,(85%)(3).Even though there is high prevalence MFPS are either misdiagnosed or missed .The behavioral problems are often mistaken and the patient's experience of pain is often interpreted as either imagined or exaggerated(1) .

Etiology

Etiology for the development of trigger points (TrPs) remains unclear .Taught bands arise before trigger points.

Following are some of the common etiologies for myofascial pain (1,4)

Injury to muscles due to trauma or repetitive strain injury.

Postural dysfunction

Physical deconditioning

Spine pathology

Nutritional deficiencies

Sleep deprivation and emotional issues (depression , anxiety)

Temperature changes

Inflammatory disorders

Obesity

Localized muscle injury increases oxidative metabolism and metabolic distress at motor end plates, especially in type 1 muscle fibers associated with static muscle tone and posture .The taut bands become active due to psychological and biomechanical stress.(1,4)

Treating the underlying etiology is the

widely accepted strategy for Myofascial pain management .If the root cause is not identified and treated, TrPs may reactivate and MFPS persists.

Clinical presentation and diagnosis(5)

*Symptoms of MFPS*

- Regional pain in the neck,shoulders,upper limbs,faces, low back and lower limbs.
- Referred pain.
- Localized tenderness of the affected muscle.
- Alteration of sleep , depression , psychological stress
- Swelling
- Fatigue
- Restriction of movements of joints which the muscles act
- Weakness of certain movements
- Paraesthesias

Essential Diagnostic Criteria for TrPs are as follows(5)

- A tender point within a taut band of skeletal muscle
- Recognition of current pain complaint by pressure on the tender nodule identifies active TrP
- Limitation to passive stretch of the motiondue to pain
- Observations to diagnose MFPS when trigger points are identified:
- Visual and tactile identification of local twitch response
- Observation of a local twitch response by needle penetration of a tender nodule
- Pain or altered sensation (in the distribution expected from a TrP in that muscle)on compression of a tender nodule.

Myofascial trigger points can be (6)

Active trigger points: - These nodules are very tender, cause referred pain and produce a twitch when touched.

Latent trigger points: - These nodules do not cause pain when touched. They can remain dormant for years and become active when there is stress or trauma

EMG demonstration of spontaneous clinical activity characteristic of active loci, Needle EMG, USG imaging, IR spectroscopy etc have been identified, however they cannot be practically applied in clinical settings due to cost and time constraints.

| Difference between MFPS and Fibromyalgia(1) | | |
|---|---|---|
| Symptoms | MFPS | Fibromyalgia |
| | Regional distribution | Diffuse pain involving several body regions |
| Onset | Acute | Insidious |
| Non musculoskeletal symptoms | Occasional | Usually present (Eg: Fatigue, Altered sleep , Irritable bowel) |
| Signs | TrP with referred pain | Tender points without reference |
| Local twitch response | Present | Absent at tender points |

**Treatment**

Pharmacological and Non-pharmacological treatment measures are used.

Pharmacological Treatment

Analgesics

NSAIDs are the most commonly used drugs for MFPS, readily available and have a relatively mild side effect profile. Despite their widespread use, there are only few RCTs (Randomized controlled trial) specifically evaluating oral NSAIDs in the treatment of MFPS. Therefore, there is a lack of strong evidence for the role of anti-inflammatory drugs in MFPS. Since there is an overlap between acute musculoskeletal disorders and MFPS, it would be reasonable to consider NSAIDs as an appropriate initial treatment in both these situations. However, long term use should be considered with caution.(2)

A Diclofenac patch was evaluated in an RCT in Myofascial pain of Trapezius muscle and was shown to have statistically significant benefits for pain, cervical ROM and neck disability index.

The patient was found to have good tolerability.(7)

Cyclooxygenase-2 inhibiters(COX-2)having a better side effect profile should be considered in patients who are more prone to gastrointestinal side effects and do not have a history of thrombotic cardiovascular disease.(2)

Tramadol is a centrally acting mu-receptor agonist, an inhibitor of dorsal horn presynaptic nor epinephrine/serotonin receptor and increases central serotonin uptake. Well tolerated in chronic pain syndromes and low back ache,used often in MFPS due to its multimodal analgesic effect.(2)

Tropisetron is a 5-$HT_3$ receptor antagonist and alpha-T-nicotinic receptor agonist, used as an analgesic for fibromyalgia and myofascial pain, but with limited availability. Local injections of tropisetron at trigger points in an RCT has shown statistical improvement in pain. Its effects lasted longer than NSAIDs.(8)

Opioids are not normally indicated, limited studies shows its effectiveness, but most studies do not support the use of opioids in MFPS. Sometimes its use can be counterproductive to recovery.(8)

Lidocaine patch alters the ability of nerves to conduct impulses. RCTs has shown that these patches had a statistically significant increased pain threshold and increase in general activity, especially promising as it is not an oral systemic drug.(2)

Muscle Relaxants

Tizanidine is a centrally acting alpha-2-adrenergic agonist, which decreases muscle spasticity. Tizanidine has shown to decrease pain intensity and disability from baseline.(9)

Benzodiazepine depresses the presynaptic release of serotonin and excite GABA which causes rapid inhibition of neurotransmission. Open labelled trials have shown clonazepam to have an antinociceptive effect in treating MFPS but there are no RCTs to prove the efficacy.2)

Cyclobenzaprine is efficacious as a muscle relaxant in MFPS but treated patients reported greater central nervous system side effects.

Thiocolchicoside, a competitive GABA antagonist and glycine agonist having anti-inflammatory, analgesic as well as muscle relaxant properties has been found to be effective in reducing muscle spasm and improving pain at rest in certain studies, but it did cause some somnolence.(2)

Multicentric, double-blind RCTs have shown the therapeutic role of anticonvulsants in fibromyalgia, there is no evidence that they are effective for MFPS and should be withheld until other interventions have been attempted.(10)

Antidepressants

Tricyclic antidepressants (TCAs) have been indicated for chronic pain, fibromyalgia and neuropathic pain. TCAs act on central serotoninergic and nor adrenergic signals, which affect central pain hallways. Compared to placebo, amitriptyline demonstrated a statistically significant reduction in tenderness (p=0.01) and pain intensity in a study on chronic tension headache, pain reduction is attributed to decreased neurotransmission of painful stimuli from the muscle rather than a general decrease in pain sensitivity.(2)

Duloxetin, A serotonin norepinephrine reuptake inhibiter (SNRI) is found to be efficacious for painful musculoskeletal conditions. A clinician must be aware of the numerous side effects of SNRI (ie, nausea, fatigue, diarrhea, hyperhidrosis, dizziness, constipation and dry mouth) as well as it's interaction with other medications.

Sumatriptan is a peripheral 5.HT receptor has shown to be effective in a few studies. (12)

Other treatment options

Botulinum toxin *A*(BoNT-A)is a potent neurotoxin that prevents muscle contraction. It may have analgesic properties through decreased productionof substance P and glutamate. Various RCTs have evaluated the effect of BoNT-A in

MFPS and have found to significantly reduce pain intensity score and duration.

However, effects were seen after 4 weeks. Contrary to this evidence two studies which compared BoNT-A to placebo showed no significant improvement in pain. Side effects like muscle weakness and paralysis are transient and reversible. (11)

Bupivacaine and Lidocaine TrPs injections have showed effectiveness in certain studies.(1)

Intramuscular Ketaminehas not shown statistically significant benefits in RCTs.(12)

Non pharmacological treatment of myofascial pain

Injections into the trigger points are effective, probably due to the mechanical disruption by the needle and termination of dysfunctional activity of involved motor end plates.

Dry needling by an in and out technique has been used as one of the fastest and effective way to inactivate trigger points. Comparing dry needling with or without lidocaine, both were effective in reducing MFPS. Various studies have suggested that dry needling can be used as the main stay of acute treatment in spite of complaints of post injection soreness. Regarding trigger point injection with local anesthetic, a systematic review has found that the nature of the injected substance makes no difference to the outcome and wet needling is not better than dry needling. There is no clear rationale to support steroid injection into trigger points as little evidence exist to support and underlying inflammatory pathology. (12)

Manual therapy is considered to be an effective technique for inactivating trigger points. Spray and stretch technique (where the taught band is stretched following a vapo-coolant spray), ischemic compression and stretch(ischemic compression for 7-10 seconds and stretch), transverse friction massage and stretch, myofascial release technique etc. are some of the manual therapies used. Although these techniques have been described with effective results, their long term effectiveness is yet to be proved. (1)

Ultrasound therapy has found to decrease the basal level electrical activity and reduce the sensitivity of trigger points in certain RCTs. Studies comparing ultrasound and diclophenac phonophoresis, reports that there is no significant difference between the two. Pressure release and phonophoresis had superior therapeutic effects compared to ultrasound in certain studies.(13)

TENS can be used as an adjuvant therapy to alleviate MFPS bur should not be considered as a monotherapy. It did show a reduction in pain immediately after therapy.

ETOIMS *(*Electrical Twitch Obtaining Intra Muscular Stimulations) uses electric currentthrough a monopolar EMG needle to engage deep motor end plates. Few studies have shown significant pain reduction and improvement in ROM with no major side effects. Even though it has shown some potential, there is still lack of RCTs to support its beneficial effects.(2)

Magnetic stimulationis a relatively newer treatment used for musculoskeletal pain. It has shown potential as a possible treatment method, however more evidence is required before advising it as an efficacious treatment strategy.(2)

Laser therapy has been used in the treatment of musculoskeletal pain including MFPS. Even though certain studies have demonstrated a significant reduction in pain and increase in urinary excretion of serotonin degradation, as a whole the body of evidence is mixed regarding the efficacy of this treatment strategy.(2)

Treating a case of MFPS, requires a lot of patience. It necessitates thorough history taking & examination which may not be possible in the first visit alone. Getting an idea of pre- existing medical conditions, ergonomic situations, personal problems and psychosocial issues help us in conquering the problem. Corrections in postural biomechanics, modifications in the office and alterations at home especially in the kitchen will help some. Chronic pain often will be associated with psychological issues like anxiety and depression and sometimes may warrant help from a psychiatry colleague.Analgesic will be helpful in the acute phase and in

exacerbation of the condition. Which analgesic to use, the choice is yours. Muscle relaxants can be used as an adjuvant in therapy when there is painful muscle spasm. In chronic pain, drugs like amitriptyline and duloxetine have always been ofhelp but choosing the right patient is important.

Also educate them about the possible adverse events during the treatment with these drugs. Some patients have reported benefits with Pregabalin, but we may come across tiredness and pedal edema.

Even though my experience about the use of various physiotherapy modalities in MFPS is limited, local ultrasound followed by stretching of the involved muscle and gradual strengthening when the pain gets better has improved the symptoms of patients. Phonophoresis with analgesic gel is beneficial in the initial phase.

Dry needling with or without local anesthetic has always helped in the treatment, the latter helped to reduce muscle soreness during the immediate post injection period.

Direct therapy to the muscle using myofascial release and manual therapies are useful but time consuming in a busy center.

Relaxation techniques, getting involved in aerobic exercises, muscle strengthening exercises with gradually increasing weight, learning of new activities like swimming, dancingetc have helped many patients. Group activities (in the gym, Zumba,) can be initiated. Getting involved in local activities in the community help patients who spend most of their time indoors.

Choosing the right treatment for the right patient should be the motto.

**Conclusion**

MFPS is a common cause for regional pain syndromes. It originates from myofascial TrPs in skeletal muscle. Diagnosis is mainly clinical. The treatment of MFPS should focus primarily on identifying the underlying cause of the symptoms. The complex pathology of central and peripheral mechanisms may contribute to the difficulty in treating MFPS. A combined use of pharmacological and non pharmacological methods judiciously

will be helpful in managing the suffering of patients with this chronic problem.

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# Cold calling

## *Soliciting **business** from customers with no prior contact.*

Dr **Ravi Sankaran**, Associate Professor, Dept of PMR, Amrita Institute of Medical Sci-

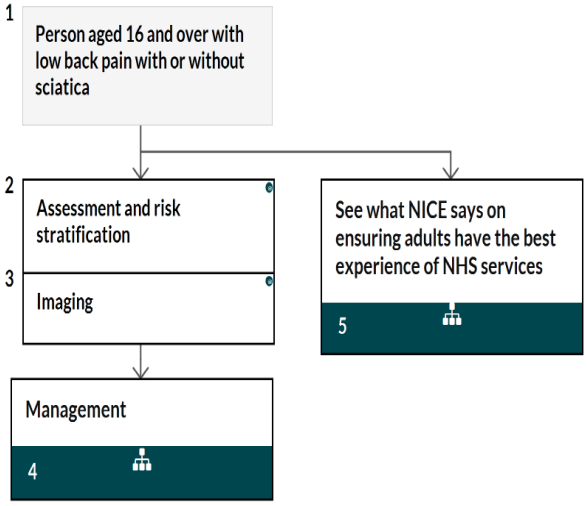
As clinicians we face this situation in reverse. Sometimes we have to make care plans for new patients with conditions we aren't familiar with. Current guidelines rarely match with patient factors forcing us to customize prescriptions. This requires experience. The author will show us their approach and compare it to the existing guidelines. With this you can gather enough information to be prepared for the patient on follow-up.

**Diagnosis:** Myofascial Pain Syndrome

**Chief complaint**: Muscle pain, neck/ low back pain

**Current Guidelines** (NICE Low back pain guidelines 2016)

**What I do.**



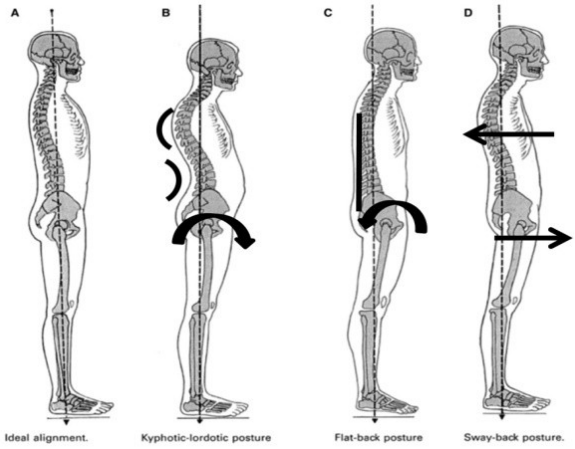

**Goal of history:** Rule of all red and yellow flags, quantify pain objectively (VAS/ NRS),

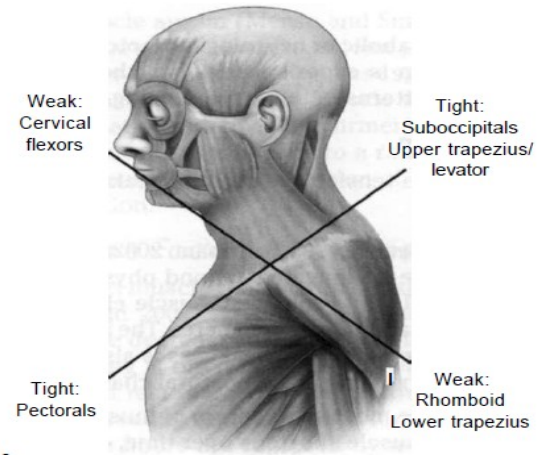
what treatments have they had so far and their outcome, check for related visceral symptoms, quality of sleep, and stress levels.

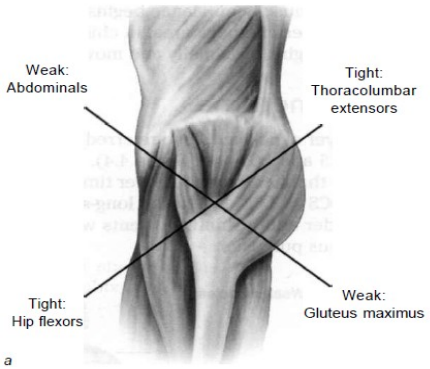
**Exam:**

a) which Kendall posture type or which of Janda's syndromes is present what treatments have they had so far and their

outcome, check for related visceral symptoms, quality of sleep, and stress levels.




b) **MTrPs:** Number and location of trigger points (MTrPs) documented by quadrant. Are they latent or active.

c) **Measures of flexibility:** Finger to Floor measurement, Popliteal angle, Tragus to wall distance

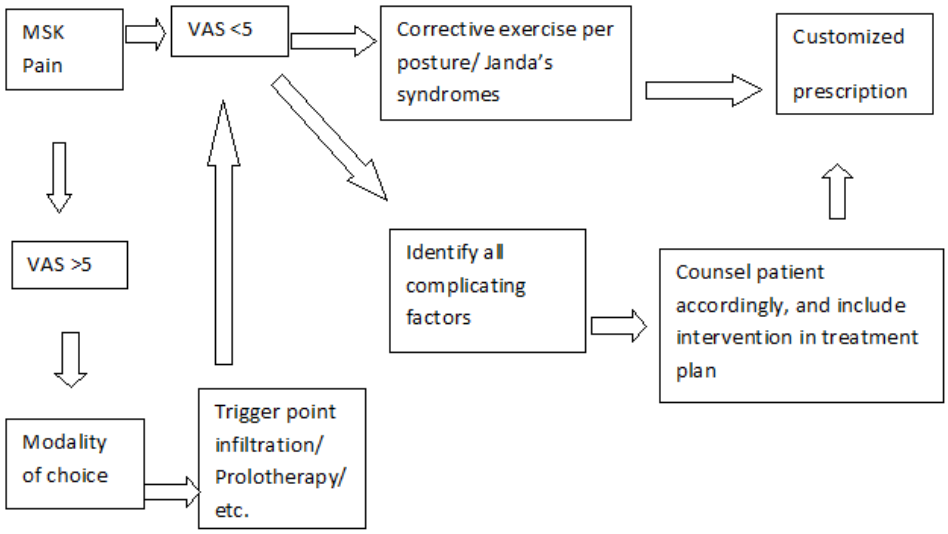
**Complicating factors:**

Mental/ Psychological factors Weight/ BMI

Ergonomics

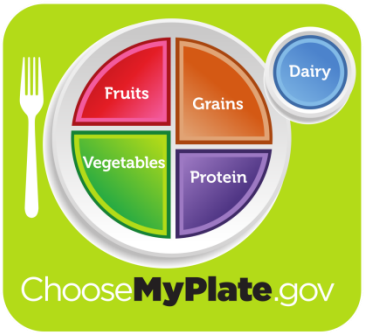
Co-morbidities

**My approach:**



**Addressing the complicating factors:**

Diet and weight loss




**Psychological issues:** fear, stress mal-adaptation

**Ergonomics:** What are they doing that creates pain?

**Co-morbidities:** What pro-inflammatory conditions do they have, and are they in remission?

**Follow-up:** Sleep, reported stress, MTrPs # and type, FTF/ Popliteal angle/ TTW

**Discussion:**

You can see just how much I deviate from the established guidelines. Often these are written for those with no musculoskeletal medicine training. Once a patient cannot be managed according to the NICE guidelines, they require referral to a pain specialist. My workflow is different than the usual. Practicing PMR in a tertiary level corporate hospital means that the patient will be a referral as opposed to a direct appointment. Much of the biochemical and radiological workup will be done, but as we all know this is just the tip of the iceberg. Those referring patients to me know they are either missing something, or don't want to deal with the patient's mental issues. Often analgesics are also prescribed and the patient is told to get 'Physio'. Having trained to do all the prior and fluoroscopic injections, I initially felt like my hands were tied. I didn't know what more could be done, until I saw even those treatments fail. Kendall's chapter on posture, and Vladimir Janda's book showed me what was missing. Having learned kinetic chains, ergonomic issues became clear. The complicating factors are another thing many overlook. Fear often stems from patients not knowing what their disease is. This is compounded when practitioners don't address the musculoskeletal imbalance and complexity factors. Patients are often told to go on a diet.

Those advising this may not understand the correlation between food intake and BMR. When a person fails the diet, it impacts their self-esteem. The myplate.gov plan is simple enough that both vegetarians and non-vegetarians can comply. (4) To get the extra weight off then, I often utilize program like tabata with a resistance band targeting the overstretched/ weak muscles. We know Advanced Glycation End-products cause inflammation and worsen trigger points (5). Controlling pro-inflammatory co-morbidities is critical to keeping this disease in remission.

The literature tells us that with either injections or modalities pain can be reduced by a VAS of 40%. (6). The difference lies in how much time it takes. Modalities like UST and Shockwave therapy take 4-6 sessions to get there, whereas injections about 10-20 minutes. This pain will stay down for 2-4 weeks. (6). More often than not, your patient will be ready to exercise below a VAS of 5, so injections can get you to the needful stage sooner. Most patients are unwilling for injections. Over the past decade here I've slowly trained our Neurologists. When a patient has severe pain Neurology will counsel them to get an injection from me. As a result, when they come to PMR they are less inclined to reject the procedure. I use modalities for patie patients unwilling for injection. We have UST, IFT, SWD, and Shockwave therapy. I feel the degree of response to these options is based on their preconceptions of the relief and the Young's modulus (elasticity of the micro-environment). I sparingly use Physical Therapy modalities, rarely inject more than once, and almost never refer patients to other services. They reach the end of the line with me.

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## CASE REPORT - I

# Musculoskeletal Ultrasonography And Electroneuromyography: Are They Complimentary?

**Dr Sreejith.K**, Additional Professor & Head,Dept of PMR, Govt Medical College,Kottayam.
**Dr Meera KM,**Junior Resident,Dept of PMR.Govt Medical College,Kottayam

INTRODUCTION

In recent years high frequency ultrasound has become increasingly used by physiatrists for diagnostic and therapeutic purposes. This modality is now a potential adjuvant tool in the evaluation of neuromuscular disease. Physiatrists are also doing a lot of NCS and EMG for diagnostic purposes.

One of the disadvantage of needle EMG is its invasive and painful nature, with a small but finite risk of direct injury to nerves, blood vessels and vital structures. Ultrasound provides high resolution imaging of soft tissues, fascial planes and neurovascular structures and the use of Ultrasound guidance for needle placement during EMG increase accuracy and decrease risk in certain setting. Ultrasound should be considered complimentary to ENMG, former provides both structural and in some cases physiological information whereas latter provides physiological information.

Here are 2 cases where Ultrasound and ENMG were used in getting an accurate diagnosis.

CASE1

A 26 year old athlete presented with pain followed by weakness in overhead motion of Right Upper limb. Initially he was seen somewhere else where he was treated with NSAIDS and physio. Over a period of time, his pain subsided but gradually developed winging of Right scapula. So he was referred to Kottayam Medical College Neurology department. From there he was referred to PMR.

On examination, apart from winging he had no other Neurological deficit

Fig 1: Winging of scapula left side

NCS was done, it showed normal CMAP of Deltoid, Supraspinatus, Biceps, APB and ADM. SNAP of all sensory nerves was normal. NCS of Long thoraxic Nerve was little bit difficult to perform. So we did an Ultrasound of Serratus Anterior muscle.

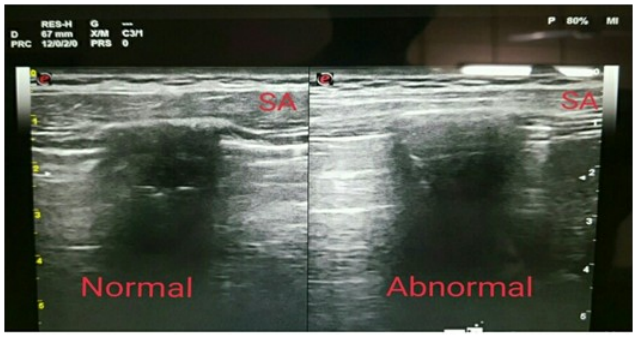



Fig 2: First image shows normal side and second image shows affected right side

It is seen that in affected side bulk of the muscle is reduced nearly half. There is also increased echogenicity of muscle suggestive of denervation.

DISCUSSION

Normal muscle has a pennate or feather like appearance in long axis and a starry night appearance when imaged in short axis.

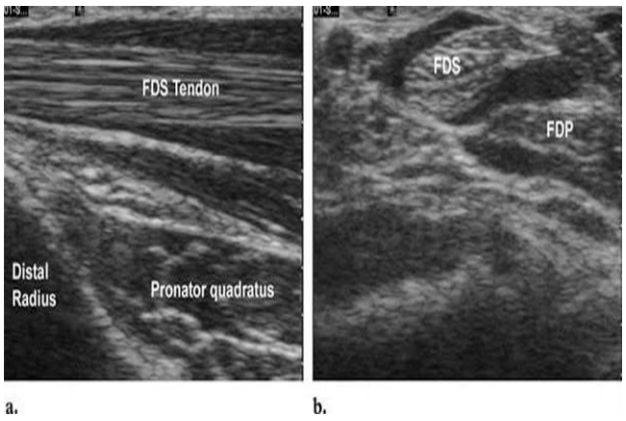
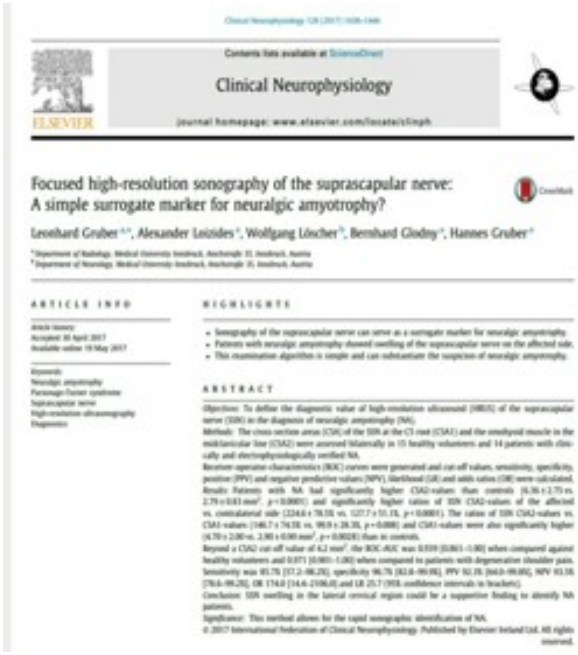



Fig 5: Serratus anterior muscle ultrasonography of our case

In Neuralgic Amyotrophy, patient presents with atypical features like shoulder pain, and weakness only after some weeks. It is difficult to make a definitive diagnosis earlier like our patient. Usually in Neuralgic Amyotrophy, Suprascapular nerve is involved in 97% of cases.



Clinical Neurophysiology

Focused high-resolution sonography of the suprascapular nerve: A simple surrogate marker for neuralgic amyotrophy?

Fig 6: A study showing SSN as a surrogate marker for Neuralgic Amyotrophy.

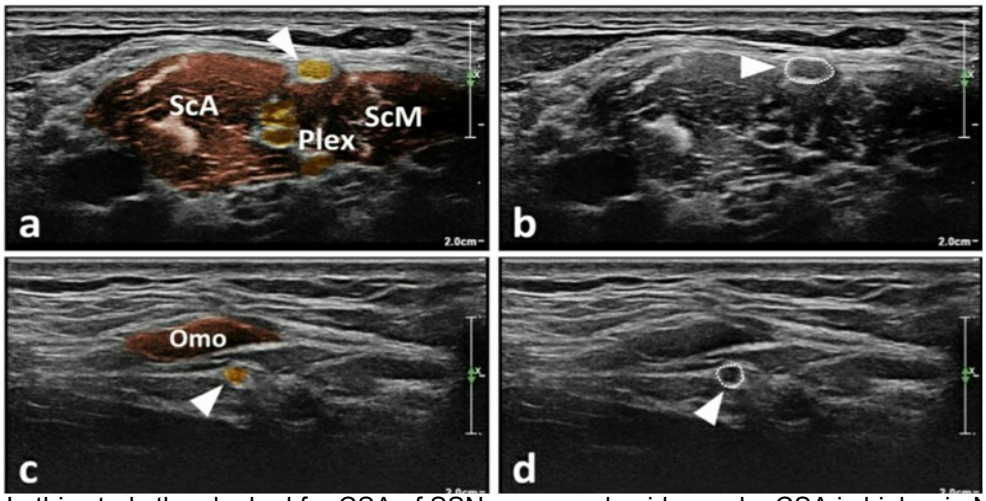



Fig 7: In this study they looked for CSA of SSN near omohyoid muscle. CSA is higher in Neuralgic Amyotrophy as compared to normal side. In this figure a and c shows normal side with normal CSA and b and d abnormal side with increased CSA.

In such case Ultrasound can help in an 'early diagnosis'.

CASE 2

A 50 year old male presented with paresthesia Right hand for 6 months duration.

On examination, Phalens test is negative. Tinel's sign is obtained over volar aspect of distal forearm, where there is a swelling which is incidently found out. It is a 3*3 cm soft, mobile swelling which is visible only during fisting

Fig 8: Volar aspect of distal forearm showing swelling

Sensory examination and Manual Muscle testing of Median nerve innervated muscles found to be normal.NCS showed mild CTS bilaterally.

Then Ultrasound was done.

Fig 9: Ultrasonography of median nerve of our case


It showed mild increase in cross sectional area of Median nerve.

When we scanned proximally we could see a well enlarged hypoechoic lesion arising from the nerve.


Fig 10: Ultrasonography of proximal part of median nerve

And with increased Doppler flow, most probably it is a Schwannoma of the Median nerve .


Fig 11: Increased vascularity with Doppler

Here also Ultrasound has helped in correct diagnosis, otherwise which will have been missed.

So both Ultrasound and EMG are useful for physiatrists for making a diagnosis and they are more complimentary.

# CASE REPORT - II

## Myofascial pain syndrome

**Dr Ammu Shanmugan**, Consultant Physiatrist, ESI hospital Thrissur

Introduction

Myofascial pain syndrome is the presentation of sensory, motor, and autonomic symptoms caused by myofascial trigger points (MTrPs) [1].

It is a regional pain problem characterized by MTrPs in palpable taut bands of skeletal muscle that refer pain to a distance from the area where the point is located, and that can cause distant motor and autonomic effects. An MTrP is a hyperirritable nodule within a taut band of a muscle that is thought to be caused by motor endplate dysfunction.

The MTrP area is painful on compression and can present with a characteristic referred pain pattern, motor dysfunction, and autonomic phenomena.

Case History

38 year old lady, a saleswoman in textile shop presented with upper and lower back pain for last 6 months ESI hospital in medicine department. She had a history of sinusitis, headache and palpitations, chest pain. ECG showed a T wave inversion in lead 2.Provisional diagnosis of mitral valve prolapse was made. Echo was normal ruling out the diagnosis.

Patient was referred to PMR department.

On primary evaluation active ROM of neck, shoulder was full. Lateral flexion of neck was painful. Myofascial trigger points were present on trapezius, levator scapula and rhomboid.

Routine blood investigation were normal, except for hypertrigylceridemia Cervical Xray showed straightening She was started on muscle relaxants thiocolchicoside, NSAIDS aceclofenac, antidepressants escitolopram for 2 weeks. Physical modality TENS and IFT for 10 days.

Patient complained of decreased relief of pain. The NSAIDS and muscle relaxant was stopped. Prolotherapy was explained to the patient. It was done over upper back interscapular region rhomboids and trapezius.

A 0.5*0.5 hard node was seen on the anterior aspect of neck was noted during the session. ENT was given a referral and the consultant send for a Usg neck

USG neck showed a well circumscribed hypoechoic lesion in midpole of right lobe with microcalcifications-TIRADS 5. And subsequent well circumscribed sub centimetric hypoechoic lesion in midpole of right lobe with central coarse calcification - TIRADS 5.

FNAC showed thyroid papillary carcinoma.

The patient underwent near total thyroidectomy. Radioiodine scan was done. Patient reported relief of pain after prolotherapy.

Conclusion

Since the early detection of neoplastic disease may have a significant impact on the morbidity and mortality of the disease, all health professionals are urged to consider this in their differential diagnosis. This becomes even more disturbing when neoplasia has been ruled out and the findings point to a myofascial basis for the complaint. It was only after the failure of treatment and the emergence of more sinister symptoms that a second evaluation discloses malignant disease(2)

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EXPERT OPINION

# Myofascial Pain Syndrome

**Dr.Roshin MV**, Assistant Professor, PMR, BCMCH, Thiruvalla

It is generally noted that in day to day clinical practice patients with myofascial pain are pumped only with anti-inflammatory medications,steroids etc and are rarely looked at holistically where the patient is ultimately burdened physically, psychologically and financially.

* Appropriate Treatment Guidelines and evidence based research on management of myofascial pain syndrome are not sufficient and requires quality research on this raw area of wide clinical utility.

**Definition:**

[1]Myofascial pain syndrome is a pain condition characterized by the presence of trigger points.

Current evidence, mostly experimental studies, clearly supports a role of trigger points on peripheral and central sensitization since they are able to contribute to sensitization of peripheral nociceptors, spinal dorsal horn neurons, and the brainstem.

**Diagnosis:**

Myofascial pain syndrome is diagnosed by the palpation of myofascial trigger points which is a small area of muscle contraction that is hard to touch and tender located on a discrete band of hardness within a muscle.[2]

Causes:

1. Trauma
2. Anxiety
3. Muscle wasting
4. Muscle ischaemia
5. Visceral pain referral
6. Radiculopathic compression of motor

7. Climatic causes[3]

sleep, irritable bowel symptoms, and chronic headaches, are also common. Although PFS is similar to myofascial pain syndrome (MPS) in that both conditions cause muscle pain and tenderness, important differences exist

Clinical features: as a comparison between Fibromyalgia and myofascial pain:

Primary fibromyalgia syndrome (PFS) is a common form of non-articular rheumatismwith diffuse musculoskeletal aching and stiffness at multiple sites and tender points at characteristic locations. Non-musculoskeletal "systemic" symptoms, for example fatigue, poor

Unlike PFS, muscle pain in MPS is usually local or regional, accompanied by trigger points. Unlike tender points, trigger points produce a referral pain pattern specific to each muscle. Moreover, "systemic" features of PFS are usually absent in MPS. However, Myofascial Pain Syndrome can progress or evolve to a fibromyalgia pain syndrome.

Common and important pathologic changes in muscle in PFS are moth-eaten appearance of Type I fiber by histochemistry, and myofibrillarlysis with glycogen and mitochondria deposition by electron microscopy; inflammatory changes are absent by light microscopy. Recent investigations have shown that PFS is a characteristic clinical entity. [4]

It is also important to eliminate any perpetuating factors and provide adequate education and home programs to patients so that recurrent or chronic pain can be avoided.[5]

**Prognosis:**

In a study by Huang YT etal states that Dry needling is an effective treatment for reducing pain and pain interference. However, long pain duration, high pain

intensity, poor quality of sleep, and repetitive stress are associated with poor outcomes. Treatment outcome depends not only on the dry needling protocol, but also on disease characteristics and patient demographic profile[6]

In another study the author discusses that early, aggressive treatment leads to improved prognosis.[7]

Myofascial pain syndrome is frustrating to patients and clinicians. Unfortunately, MPS often goes unrecognized, misdiagnosed, or mistreated, leading to unnecessary pain, suffering, and disability. When treated properly, MPS has an excellent prognosis. Besides specific TrP therapy, treatment involves lifestyle changes and long-term management to prevent recurrences. A multidisciplinary approach utilizing primary care providers particularly physiatrists, physical therapists, occupational therapists, and other health care professionals is essential to correctly assess and treat MPS. Primary care providers knowledgeable about MPS are in a pivotal position to identify this disorder and to intervene appropriately.[8]

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COMMUNICATOR

# A Narrative History Of PMR In Kerala

**Dr.S. Hariharan,** Consultant Physiatrist

Episode 1: How it started from nothing?

Thoughts before action:

It was April of 1959 and Trivandrum the city, as we know, had a fourth of its current population. At Trivandrum Medical College (TMC) internship had ended and a young doctor was assigned the role of a provisional Tutor of the Orthopedics department. His name was PB Muraleedhara Menon. As our young physician meandered the wards, he was struck by the amount of suffering surrounding him. Certainly, the stalwarts like Dr. Ananthachari were working tirelessly with their students, but something was missing. The concept of treating the whole person in modern medicine had not dawned. Medical and surgical care was directed to diseases only. In the hustle to save lives, the person whom the disease had caught, was not being addressed in total. What really drove this home was the pitiable plight of those with Spinal Cord Injuries. He watched them suffer from complications, then get discharged without proper rehabilitation or a plan of care. The suffering of his fellow men wrenched his heart and he spent time exploring options to give quality to the life, healthcare had given back to them. Sadly he could not get an easy answer at that time. Neither Google nor rehabilitation existed.

In his own words, he never planned to become a PMR doctor. The field had not been conceived for him to identify with its label. The library had no rehabilitation books, and Braddom, as we know it was released much later. Dr. M. Thangavelu, the past time Dean of TMC was keen on developing the various disciplines of medicine including the super specialties. In those days General Medicine was true to its name, no specialties like Cardiology, etc existed. Even fields like ENT were under General Surgery. Super specialties were at best hearsay. To optimize care, the Dean was earmarking enthusiastic capable young doctors to be refined for specialization. Dr. Menon spoke about his patients' plight and the response came that he would look for options to care for such people. Not satisfied, Dr. Menon continued his quest for knowledge. The then Head of Orthopedics, Dr. K.I. George was an erudite and strict professor. His ear was not spared the miseries Menon saw and the same discussion of improving care for the disabled continued. 'Fall down seven times and stand up eight' goes the saying. Menon found out about Dr. Howard A.

Rusk and how he had started rehabilitation in the USA. While it existed before, Rusk structured the field and was spreading the model with the intent on developing PMR worldwide. Around this time, Menon got confirmed as Aassistant Surgeon in Kerala Health Services, a coveted job in those days. He left the medical college system, but as luck was in his favour he got selected as permanent Orthopedics Tutor in Medical College in 1963. Menon wrote to Dr. Rusk after completing ECFMG, resulting in his selection for training as a Melvin J Mass Memorial Fellow in July 1964. Dr. M. Thangavelu contacted Rusk and completed the Kerala government's clearance formalities.

The scenes elsewhere :

Seeds of the many current rehabilitation bastions were sown here and there at this time. Social Rehabilitation Services (SRS) of the USA was trying to meet the world wide rehabilitation supply gap. The World Rehabilitation Fund (WRF) was started in the USA and many state governments of India benefited from this. As early as 1954, an All India Institute of Physical Medicine and Rehabilitation (AIIPMR) was started in Mumbai and it was headed by Dr.M.V.Sant, an Orthopaedic Surgeon under DGHS. In Delhi, the Physical Medicine and Rehabilitation department started as a PL480 project of ICMR and funded by the US in the mid sixties. The then Community Medicine Head (Dr. Chhiblani) was appointed to look after the project. Shortly Dr. B.P. Yadav with MS (Ortho) and special training in PMR took over charge of the department in AIIMS. Christian Medical College, Vellore also developed a PMR dept and it was headed by Dr. Mary Varghese. Madras Medical College also developed a PMR project under the directorship of Dr. M.Natarajan, an eminent Orthopedic Surgeon. Calcutta also saw the development of PMR through Dr.S.K. Banerjee and Dr. S.K. Sarkar.

Dr. PBM Menon's training

Dr. Menon arrived at Rusk Institute of Rehabilitation in New York in 1964.Though his Residency training ended in 1967, he simultaneously obtained a Fellowship of the Royal College of Surgeons (FRCS Edin) Edinburg on the academic recommendation of two FRCS qualified faculties. After completion of Residency in PMR, he was appointed as Registrar in PMR at the Rusk Institute for one additional year. During this time he also acquired D. Phys. Med.(London) because of his training in the USA.

Through Dr. Menon, Dr.Thangavelu met Mrs Mary D. Switzer, the then Chief of the SRS in America in 1966 and this helped for establishing a Comprehensive Rehabilitation Research and Training Project in TMC (CRRTP). To jumpstart this, a National Seminar on Rehabilitation Services and Research was held in the same year in Trivandrum Medical College. This CRRTP was

channeled through the ICMR's PL-480 funds by the SRS of USA. This seminar was a 'nourishing manure' for the seeds of PMR sown in Kerala at that time. The Dec 1967 seminar was attended by American leaders in PMR, ICMR stalwarts and Indian experts related to all types of disabilities. The CRRT Project which was started in June 1967, was initially manned by the then Orthopedics Professor, Dr. K.I. George, until Dr. PBM Menon came back from the States.

How I 'tasted' Rehabilitation?

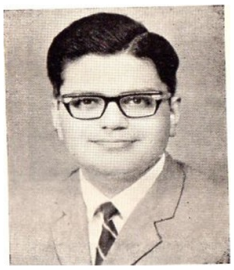
The author of this article (myself) was in the final year studies of MBBS in Trivandrum Medical College at the time of this unique Rehabilitation seminar. As 'Fate decides the destiny', I was introduced to the days of this conference as a Student Volunteer by the then Principal, Dr.M. Thangavelu himself. Even though, I did not participate in the detailed proceeding of this seminar, I felt it had attracted me a lot and it occupied a safe position in my 'heart' to rise up in future, when I was given an opportunity to join the erstwhile CRRT project in 1970. I also could not interact deeply with Dr. Menon during the time of the first national seminar. Moreover, they were the days of my final MBBS exams and hence could not devote much attention to the conference details.

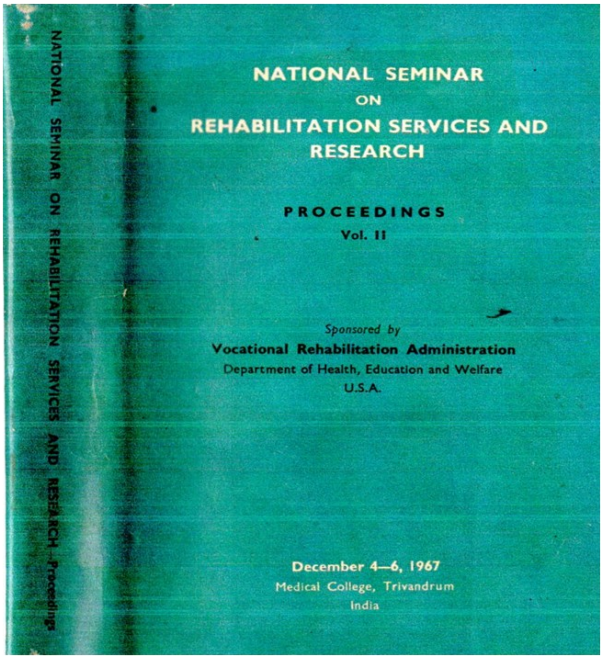
Proceedings of the first National Seminar in Rehabilitation

The conference proceedings were published by Dr. Thangavelu in two volumes. The volume II contained all the papers presented during this seminar. The 'Foreword' written by Dr.Thangavelu in this Volume II is reproduced as appendix to understand the 'Vision' of our then Visionary Principal:-

(to be continued….)

Appendix 1





Appendix 2 a

Dr. M. Thangavelu

## Foreword

THE Papers and Reports presented during the 3-day First National Seminar on Rehabilitation Services and Research in INDIA are collected in this second Volume. The first volume carried information about the inaugural session, programmes, resolutions and list of participants.

The Seminar was jointly sponsored by the Social and Rehabilitation Services of the Department of Health, Education and Welfare, Washington, D.C. Dr. Mary E. Switzer, Administrator of SRS, and Colonel B. L. Taneja, Director General of Indian Council of Medical Research, blessed this venture and made it possible for the Seminar to be held in Medical College, Trivandrum. Mr. James Garrett and Dr. Martin E. McCavitt were extremely generous in providing finances and rendering valuable guidance in planning the programme. I record my appreciation for the good samaritan role played by Mr. Joseph M. La Rocca and Mr. Eugene J. Taylor, Secretary-Treasurer of the World Rehabilitation Fund.

Nearly three hundred representatives from different parts of India and some friends from abroad participated in the Seminar. They were very cooperative and contributed considerably towards the success of the Seminar. The participants were prompt in forwarding their papers and had responded without delay to correspondence. It was a pleasure to have under the same roof all these eminent Social Workers animatedly discussing the diverse aspects of the welfare of the handicapped.

My friends Dr. M. Natarajan, Professor of Orthopaedics, Madras Medical College and Dr. G. Venkataswamy, Professor of Ophthalmology, Madurai Medical College, have stood by my side and very generously assisted in the planning, organizing, conducting the Seminar and preparing the proceedings for publication. I am deeply indebted to them for their valuable help at all stages.

The printing of the proceedings of the conference was possible owing to the generous assistance rendered by Mr. Eugene A. Byrne, Chief, Participant Training Program, American Embassy, New Delhi and his



Appendix 2 b

editorial colleague, Mr. Douglas A. Ferris. I record my grateful thanks to them and specially to Mr. Byrne for making available so readily all guidance and assistance for the excellent editing of these two volumes. I am grateful to Mr. M. L. Gupta, Manager of Indraprastha Press for the excellent printing of these Volumes.

The wealth of scientific data and information provided in these two volumes will be of immense help and guidance to the participants of the Seminar in particular, and to rehabilitation workers in general. Let us hope that the interest generated about the problem of the handicapped during the Seminar will lead to focussing public opinion on the question of rehabilitating these unfortunate brethren of ours. Indeed, there are immense possibilities in the field of organizing rehabilitation services for the handicapped. Concerted and sustained efforts, transcending all barriers of national, international and individual levels, should be expeditiously undertaken to help the handicapped, thereby extending considerably the frontiers of human happiness.

M. Thangavelu

DR. M. THANGAVELU, M.D.
*Principal*
Medical College, Trivandrum-XI.

## LEADER AND TEAM MEMBER

# Why is research critical to the survival of our field?

**Dr Ravi Sankaran**, Associate Professor, Dept of PMR, Amrita Institute of Medical Sciences

Throughout residencies, I found myself at odds with existing treatment protocols of the time. It was standard to diurese a decompensated CHF patient, but why some of my teachers put in a foley and used high doses of IV furosemide versus others who would slowly unload the patient's fluid excess per urethra confounded me at times. Of course, patient factors and treating doctor's personal preferences were part of the answer, but literature reviews rarely provided clarity on what options wouldn't get my attending stressed out. What was more confusing was when one teacher advocated torsemide over furosemide, and no literature existed outside of Goodman and Gilman's discussion on pharmacokinetics for the drugs. And that was Internal Medicine, where guidelines are well defined.

PMR was even more confusing. Why did some patients do well with rehabilitation and others not? Why were some of my acute stroke patients rapidly improving after 5 sessions of Hyperbaric Oxygen Therapy (HBOT), versus some who took 20 sessions or didn't improve despite being similar for co-morbidities, age group, stroke location, and complications? This information was critical when the next family came and asked if HBOT would help their patient or not. And it didn't exist until I did and published the study. (1)

So why is research important?

Curiosity is the sign of an active mind. Caring for sick humans is a tricky mix of art and science. When the expected outcome doesn't occur, we are forced to read. Eventually one gains so much knowledge they deviate from the beaten path. Done consistently enough one becomes a specialist of their preferred

topic. Few have the privilege to get certified in their area of interest. Anyone can hypothesize on why their patients end up as they will. Of course, without validation, the conclusions formed are fraught with bias, so testing these becomes critical. While reading all the expert opinions (literature review) one sees how, why, and where they disagree. And from there fine-tune a hypothesis to test. Either one leads the pack or is a follower. No one can know everything, and being humble enough to follow sound advice is important. On the other side, one cannot know the value of what they are following until they try a hand at doing studies. Having done a study and publishing it, of course, validates ones standing and edification follows.

On a lighter note, professional practice progresses through four stages: learning the basic skills and operations, developing competence, moving toward client-centered practice, and vigilance for the profession as a whole. (2) For academic physicians learning never ends. Along with gaining expert-level clinical competencies the soft skills of professionalism must be nurtured. Being a good teacher of future doctors means: knowing how to teach adults, assess and provide feedback, grow the curriculum, and provide education across venues ranging from the patient's bed to the didactic session. To ensure the profession remains viable one must actively do research. (3)

Because Modern Medicine gives less value to human function to pursue diseases, inevitably a situation arises where treatment options cannot be applied to the patient. This is ripe territory for research. Paramedicals around the world have capitalized on this, and publish. A lab my brother worked in had a PhD who published thirteen papers a year. He used that as leverage to take command of the entire outfit and push out his boss. Luckily our council has given us motivation. No longer is the motto 'publish or perish'. Now it is 'publish or watch your subordinates take charge over you'.

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# LIFELONG LEARNER

## Things I learned outside the books

**Dr Ravi Sankaran,** Associate Professor, Dept of PMR, Amrita Institute of Medical Sciences

The late 2000's found me as an Internal Medicine resident in McLaren Regional Medical Center in my hometown of Flint, Michigan. As the state had been abandoned by General Motors much of our non-acute work was sorting out if pain patients were really just looking for narcotics or had actual pain. Below are some incidents from those days.

Pre-Obama America was not so egalitarian. One of my seniors was a Syrian native. He was an excellent clinician and very sincere. He had a patient who was a middle aged Caucasian from a Roman Catholic background with chronic pain for 5 years. Thorough investigations ruled out all possible causes as everything came back normal. Having undergone multiple analgesic courses his liver and kidney began to suffer, and the concerned doctor became concerned as he still wasn't getting better. Despite having undergone 3 messy divorces in the same duration he was still feeling happy. His ex-wives would cheat on him, and he was ok with keeping or losing them. Aside from this he had a stable job and was a pleasant person. Our residency program had a psychologist who happened to overhear the doctor explaining the case to his attending. She had a hunch as to what could be wrong. As repulsive as it was to the doctor, she told this man to get male lover. Being non-heterosexual herself, she had seen many similar stories. He 'came out' and 3 months later was back pain free, off medications, and happy with his new partner. When there is refractory pain, a patient may not directly tell you what the issue is. If you want to help you'll have to go out on a limb. Another of my seniors had a patient with a puzzling diagnosis. A 24 year old unemployed obese African American

female came to our IM Residents Group Practice clinic. Despite having no clinical features outside of myofascial trigger points the usual blanket of investigations were sent. While everything was normal her serum ANA returned as mildly positive. The resident seeing all this was confused and approached their attending to help sort out if this was a false positive result, as obesity is a pro-inflammatory state or really SLE. The attending went on to find out that living at home with mom in low-cost housing was compounding her difficulty. Lack of a basic education degree didn't leave her many work options, and those available often made her chronic back pain worse. This reached its nadir when her boyfriend broke up with her then started dating her mom. She got more depressed when he joined the mother in the bedroom. Sitting in front of a TV while others were enjoying, lead to back pain. The attending came back with a diagnosis of fibromyalgia, and the patient symptomatically improved with the correct treatment. When in doubt recheck the history and exam. More tests can be confounding.

## Answers Quiz #1

| | |
|---|---|
| Transduction<br><br>(receptor activation) | One form of energy (thermal, mechanical, or chemical stimulus) is converted electrochemically into nerve impulses (action potentials) in primary afferents. |
| Transmission | Coded information is transferred from primary afferent fibers to spinal cord dorsal horn & onto brainstem, thalamus, & higher cortical structures. |
| Modulation | Involves activity- & signal-induced dorsal horn neural plasticity, which includes altered receptor & channel function (i.e., wind-up & central sensitization), gene expression, & changes in brain-mediated descending inhibition & facilitation. |
| Perception | Begins with activation of sensory cortex. The cortex is in intimate communication with motor & prefrontal cortices, which initiate efferent responses, as well as more primitive structures involved in the emotive aspects of pain. |

Answer keys

1. (b)
2. (d)
3. (a)
4. (a)
5. (c)
6. (c)
7. (a)
8. (d)
9. (a)
10. (d)

| | ***Multidisciplinary Pain Center*** | ***Multidisciplinary Pain Clinic*** | ***PainClinic*** | ***Modality-Oriented Clinic*** |
|---|---|---|---|---|
| Comprehensive assessment & | Yes | Yes | Yes | No |
| Physicians | Multispeciality | Multispeciality | Single speciality | Single speciality |
| Psychologists | Yes | Yes | Variable | No |
| Other health care professionals | Physical, occupational, recreation therapists; nurses; biofeedback, relaxation specialists; movement-based therapy practitioners; vocational counsellors; other specialists. | Physical, occupational, recreation therapists; nurses; biofeedback, relaxation specialists; movement-based therapy practitioners; vocational counsellors; other specialists | Variable | No |
| Therapeutic modalities | Multiple | Multiple | Variable | Focused |
| Affiliation | Major health science institutions | Variable | Variable | Variable |
| Research & educational activity | Yes | Variable, not typical | Variable, not typical | Variable, not typical |
| General or specific focus of care | Comprehensive, acute & chronic pain | Comprehensive, chronic pain | Specific, chronic pain (i.e. regional focus such as headaches) | Specific, acute & chronic pain(i.e., nerve block clinics) |

# Answers Quiz #2

1.(c) Hyperalgesia – An increased response to a stimulus that is normally painful

Dysesthesia - An unpleasant abnormal sensation, whether spontaneous or evoked

Paresthesia – An abnormal sensation, whether spontaneous or evoked, that is not unpleasant

Allodynia – Pain caused by a stimulus that does not normally provoke pain

2. (d) Apkarianet al. Studied brain morphologic changes with use of high-resolution MRI in a group of patients with chronic low back pain. Significant evidence of discrete central nervous system degeneration (gray matter atrophy) in the chronic pain patient group was demonstrated. Discrete thalamic & prefrontal cortex atrophy was reported at a rate approximately 5 to 10 times greater than that of normal age-related atrophy.

3 (b) *Normal pain, or nociception, is characterized primarily by the processes of transduction & transmission, with minimal emphasis on modulation & a 'normal' perception process. With chronic or persistent pain states, there is a shift of focus to the processes of modulation & perception.*

4. (a) B & C fibers are unmyelinated .B fibers serve as preganglionic autonomic nerve fibers& C fibers as the postganglionic autonomic nerve fibers.
C fibers serve the sensory function of transmitting pain & temperature.

5. (b)
6. (d)
7. (b)
8. (d) Diclofenac has a half life of 2 hrs.
Naproxen has a half life of 12-15 hrs.
Meloxicam has a half life of 15-20hrs. It's mechanism of action is Prostaglandin synthetase inhibition; some selectivity for COX-2. It exhibits analgesic, antipyretic & anti-inflammatory actions.

9. (b) The classes of NSAIDs & the commonly used compounds in each class are as under COX-2 inhibitors Celecoxib
Oxicam derivatives Meloxicam
Propionic acid derivatives Ibuprofen, Naproxen
Saicylate derivatives Aspirin,Salsalate
Para-aminophenol derivatives Acetaminophen
Barbituric acid derivatives Butalbital compounds

10 (c)

# Research is Fun- Preferred Scales

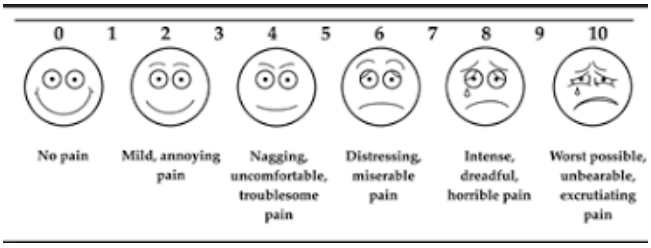
**Dr Ravi Sankaran,** Associate Professor, Dept of PMR, Amrita Institute of Medical Sciences

Sometimes what a patient says doesn't match what we see clinically. Scales give us objective measures. We can see if patients are responding to the care provided temporally. In the bigger picture though, these can be run through statistical tests to obtain p-values. This facilitates publication.

Patients who complain of pain often have difficulty objectifying it. Mild, moderate, and severe are the most common responses. Problems emerge on follow-up if we still use this scale of 3 measures. The magnitude of change is not easily represented.

When I ask my patients how much percentage pain they have the majority say they have no idea, then resort to the prior mentioned measure. Luckily the Visual Analog Scale has faces to express degrees of discomfort, and these correlate to a numerical value.

Why the obsession with numbers? We see interesting patterns emerge with its use. Some patients complain of severe pain that has no clinical correlate. Others are the opposite, with reports of 2/10 pain but may have 20 trigger points. Simply put the scale helps us frame the extent of problems. VAS is one of the more frequently used measures in studies. When subjective pain reports don't match objective measures we should look deeper into why such is the case.




Type- Ordinal (variables have natural, ordered categories and the distances between the categories is not known) 1

Validation- Yes it is validated for pain patients 2

Implementation

Ask your patient their pain percentage. Utilize the faces if the numbers are unclear to them.

How not to use it- Look at the patient's face and decide their score for them.

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1. Agresti, Alan (2013). *Categorical Data Analysis* (3 ed.). Hoboken, New Jersey: John Wiley & Sons. ISBN 978-0-470-46363-5
2. Delgado DA, Lambert BS, Boutris N, et al. Validation of Digital Visual Analog Scale Pain Scoring With a Traditional Paper-based Visual Analog Scale in Adults. *J Am Acad Orthop Surg Glob Res Rev*. 2018;2(3):e088. Published 2018 Mar 23. doi:10.5435/JAAOSGlobal-D-17-00088

RAISE YOUR LIMITS

**Dr.Muralidharan PC,** Associate Professor, Dept of PMR, Medical College Kottayam

**Train high, live high**

The high altitude training system is famed for boosting the endurance of athletes and such a training facility was started at Jimmy George Indoor Stadium, Trivandrum in 2015 under the Directorate of Sports & Youth Affairs, being the first of its kind in South India.

ASTRA (Altitude-Simulated Training Centre for Athletes) is a hypoxic chamber which simulates altitude by reducing the percentage of oxygen in the air for training purposes. This helps the athletes to prepare for competing at higher altitudes and stimulates physiological adaptations that translate to a better performance at sea level.


According to experts, hig altitude training will help sportsmen to achieve 2-3% increase in physical endurance and thereby win medals in international events.

**In depth**

ASTRA is designed to provide two types of services called protocols - one is active protocol and the other is passive protocol. At present the active protocol is only

functional which is intended for the general public. The passive protocol meant for sports stars has not yet commenced.

The training centre runs from 6:00 to 9:00am in the morning and 5:00 to 9:00pm in the evening under the supervision of Dr. Sankar Ram, who is a sports medicinespecialist and the Medical officer of Rajiv Gandhi Sports Medicine Centre. With 8 years of experience in the sports fitness field, Mr. Ratheesh Bala, former under-16 State Tennis Champion, trains the participants in ASTRA. They are more than happy to share their knowledge with the members and solve any doubts about training,excercises, technique, nutrition and more.

The training is conducted as 21 days course, with each session of 1 hour. Once a person completes a course at the centre, its benefit would last 10 to 20 days. At present, ASTRA has the capacity to hold 6 to 8 members at a time.

Personalised training is another feature each session is customised with the physical condition and requirement of each member.So the maximum benefit can be achieved from a single course.

More than a source of endurance booster, ASTRA serves multiple health benefits. Fat burning is the most in demand. Recently an airhostess lost her weight by about 10 kilograms with 2 courses, certifies the trainer.

Another highlight is trek training - like Kailas Manasarovar yatra. They are being trained to continuous walking upto 3-6 kilometres with trekking bags and other gadgets in the artificial atmosphere and their body will perfectly mould to fit the high altitude within two courses.


Each session includes warming up and workout on machines like Treadmill, Rowing machine, Cross-trainer and Exercise Bikes, and at regular intervals they are advised to take rest and hydrate.

Another attraction is that, heart rate and saturation are constantly monitored with the assistance of a Pulse Oximeter during the entire session and workouts are completely based on this assessment.

Advanced studies on Altitude-Simulated Training prove that, this integrated training increases oxygen absorption, transportation and utilization which in turn improves the quality of blood circulation and experience cardiovascular benefits like reducing fatigue and faster recovery from training and related injuries.

The entire system is maintained by International Tennis School with advanced German Technology, which provides filtered fresh air to hypoxic chamber that gives comfort for lungs even to the rookie members.

**Behind the door**

Normally during the workouts at high altitude, athletes feel like they are putting forth more effort to perform as well as they do close to sea level. The increased rate of perceived exertion is caused by a decrease in the amount of oxygen being delivered to the muscles to burn fuel and create energy. In order to acclimatize to the higher altitude, the proportion of red blood cells must be increased which allows their blood to carry more oxygen. When they compete at lower altitudes, they get a natural boost to the muscles when additional oxygen is available. This tiny improvement could be an upper hand over the opponent to earn the medal.

ASTRA, it is not just about winning medals, but an earnest attempt for grooming our athletes to take up the challenge at the highest levels of competition

**Passive protocol – 'Live high, train low'**

Many elite athletes rely on "live high, train low" altitude training programs to shave off precious seconds during their races. To benefit, athletes must spend a minimum of 8-12 hours a day – in an ideal spot above sea level. If they get too much higher, that will leads to altitude sickness. 8,000 feet above sea level is such a sweet spot for the training.


Reminding this in mind the visionary founders of ASTRA took steps to develop such facility, for that purpose the chamber will rearrange to a resting room where 6 members could take 6-8 hours undisturbed sleeping. After that they are advised to take training in the normal atmosphere outside. Unfortunately the system is not yet started due to the lack of members for the programme. The centre is looking forward to start the passive protocol service soon with the active involvement from the interested athletes.

Compiled by

Dr Muralidharan PC ,Physiatrist, Kerala

PROFESSIONAL

# Journal versus Bulletin: Worth the headache?

**Dr Ravi Sankaran,** Associate Professor, Dept of PMR, Amrita Institute of Medical Sciences

While the current KJPMR is actually a bulletin, it aspires to become indexed. This is a multistep process that requires the complete support of all of Kerala's Physiatrists. Why? Let's explore below.

How are bulletins different from journals? Bulletins have no peer review, are mostly opinion, have non-research material, and provide a way to connect people. Our photo gallery from World disability day is such, along with the entire 'Members in Action' section. Journals are peer reviewed, and only high quality research is accepted. As they are indexed and copyrighted a full team is needed. Obviously we are not there yet.

Where to start? Seeing KJPMR is in its third reincarnation, currently submissions are needed to sustain it. What to submit? Conference presentations (oral / poster) and PG thesis are the first place to look as many never go further than a souvenir book. Often these are fraught with problems like: lack of scientific rigor, inadequate sample size, unsound methodology, and use of inappropriate statistical analysis.(1) Regardless they are a start. If these studies are flawed though, why bother submitting them? The peer review will point out the flaws, providing a learning opportunity for all readers. The other submission type is expert opinion/ review articles. The new 'invited author' section is designed to do this. Both the mentioned are easy routes to become familiar with the publication process, and a way to reach the goal.

There are many indexing services, Pubmed being among the most common. Indexing services look at the following processes: Timeliness of publication, Quality of peer review, Distinctiveness of subject area, Internationality, Number of citations. Timeliness speaks for itself. Does the team publish regularly or not? Quality of peer review is a bit trickier. Anyone who has gone through this knows how an ignorant reviewer can sabotage a publication. Distinctiveness is relatively easy as we are already subject specific. As we are a local journal though, internationality/ ability to generalize will be a problem. The same can be strength if we use this for specific sub-populations. Number of citations is the hardest though. Anyone who has done a good study will want it in an indexed journal. This is why we should start with our conference work.

I

It's not enough to be indexed though. The value of a journal is reflected in its Impact Factor (IF). It is the metric authors consider when choosing where to submit. The sum of publications amounts to individual impact factor in sites like researchgate.com. This is where people go for guidance, seek faculty speakers etc. A popular senior community physician with great experience and many publications in low impact journals on a specific topic may be overlooked in favor of a young Dr with one high impact publication in the same topic.

What is IF? A journal's IF is based on two elements: the numerator (the number of citations in the current year to any items published in a journal in the previous 2 years), and the denominator (number of cited articles published in the same 2 years) (2). Naturally the higher the number the better, and harder it is to get into.

The primary beneficiary of KJPMR is you dear reader. Our bulletin is a safe place to submit, and get constructive feedback. This is the perfect opportunity to grow your knowledge base. Anyone can read, but only a master can teach someone else. Anyone can contribute in a variety of ways. Just look at the narratives I put in the 'Lifelong learner' section, or see how your colleagues have helped. This is not just about having a safe haven to facilitate promotion. PMR in Kerala can grow as a whole if each of us but submits something once a year. We have more than 160 people in our group, amongst the largest PMR population in India. Our upcoming generation can reap the rewards of our work, and the field can advance in ways no one saw coming.

As we progress through issues, I will be addressing more topics related to writing and publishing. Stay tuned.

References

1. Balhara YPS, Publication: An essential step in research, Lung India. 2011 Oct-Dec; 28(4): 324–325.
2. Kumar V, Impact of the impact factor in biomedical research: its use and misuse. Singapore Med J 2009;50:752

# MEMBERS IN ACTION


**Dr Reshma J**

Expert committee meeting for research on Autism spectrum disorder & Cerebral palsy by ministry of AYUSH at NIEPMD
Joined as Institutional Ethics Board member.

**Dr Sudheedra** - Conducted a camp.

A talk on stroke rehabilitation, and Spinal cord injury was given
Took a class on Muscle grading and Duchenne muscle dystrophy and myositis as extended curriculum activity for 1st year MBBS students
Purchased some equipments for PMR unit which was not there For CP children,

**Dr Santosh Raghavan**

We successfully completed a four day ECE sessions for our first year students. Each day comprised of four hour sessions out of this the first half an hour for a power point presentation which was followed by live demonstration of musculoskeletal ultrasound, pedobarography and electromyography/ never conduction study. We have given training for 150 students.

**Dr Sreekala**

1.Started seperate OP for PMR at Govt Medical College Ernakulam with the help of 1 regular physiotherapist and 2 contract PT's.

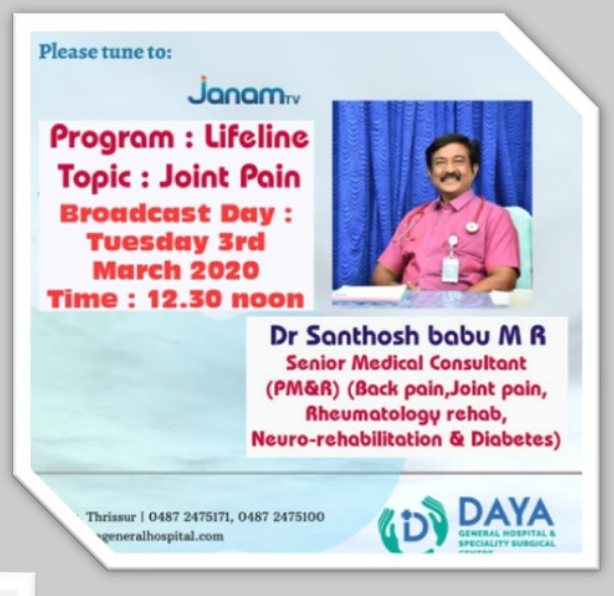
2. Started CBR along with dept of Community Medicine from January onwards.

**Dr Ravi Sankaran**

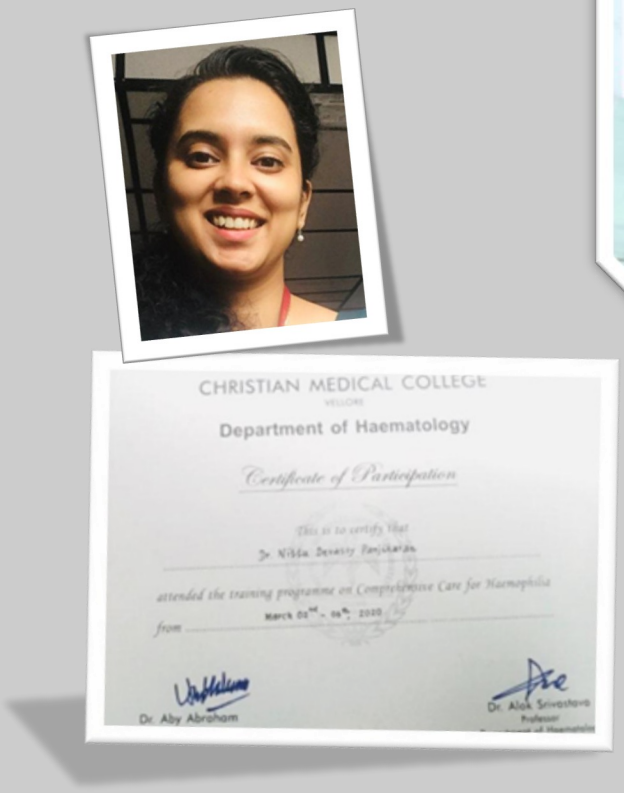
1 year anniversary of robotic rehabilitation service

5 year anniversary of Hyperbaric Medical service

**Dr Santosh Babu**




**Dr Nittu**
Hemophilia Advanced care certification




**Dr Noufal Ali** presenting Stroke rehab at the Geriatrics conference at BMH

# IAPMRCON 2020 KOZHIKODE





Convocation with passed out PG students,
Dr Preetha, Dr Rebecca, Dr Padmapriya

**Dr Remya Mathew**
A talk on stroke rehabiliation


Neurodevelopmental chapter of IAP Kerala inaugurated on 9th February with an excellent CME program!
Dr. Maya Bose Vinod and Dr. Sindhu Vijayakumar spoke about Approach to global Developmental delay and AT and orthotics/ prosthetics in Early intervention respectively!

President Sir does Zumba
at National conference

Dr. Hariharan

Attended national IAPMR annual conference at Calicut in January 2020 and presented a paper on latest concepts in CBR services.
*Gave scientific talks on pains in the elderly to members of voluntary organisations.
*One article in Malayalam on"lessening doctor - patient relationships ", published in a Malayalam journal,"Santhiparvam" by the Senior Citizens Service Council (vol8, no.1,January 2020 issue)

Dr. Vidya. G

Joined the Dept. of Physical Medicine and Rehabilitation at KIMS, Trivandrum led by Dr. Hariharan sir and Dr. Prasad Mathews sir in January 2020. **Neurorehabilitation** by physiatrist led multidisciplinary team of dedicated professionals backed by support of consultants from all medical specialities ensures comprehensive care that helps patients with Stroke, Traumatic brain injury and Spinal cord injury to reach their maximal functional ability.

KIMS **centre for child development** took shape in February to address the needs of children with developmental or behavioural problems. These children are assessed by a panel of experts which includes Dr. Lakshmi Nair, consultant physiatrist, Dr. Reeba, developmental paediatrician, Dr.Vinod Krishnan, paediatric orthopedician, child psychologist and allied medical professionals. A comprehensive plan of care and parental guidance are provided to help children reach their best potential.

Witnessed the birth of **KIMS-INALI foundation**, an innovative venture for providing low cost, light weight upper extremity prostheses with a functional hand for simple grasp function. Low cost electric and myoelectric models have been developed by Mr. Prashant Gade, CEO of INALI assistive tech, with assistance from Dassault Aviation.

Effort is going on to provide a **3-D printed bionic hand** at a very low cost. As a first step, the 3-D printer has been installed in KIMS, TVM. Hopeful that we can start providing affordable advanced bionic hands in a few months time.

Glad to work in **KIMS-BMVSS Jaipur foot centre** , which has given about 400 prostheses free of cost in the last 10 months. It aims at improving the function and quality of patients who cannot otherwise afford any kind of prosthesis. It has now evolved to provide light weight paediatric prostheses and upper extremity prostheses with electric hand.

Had a good experience working with Motivation, an international disability and development organization. Through the **KIMS-Motivation wheelchair centre**, we now provide various models of customized manual wheelchairs meeting WHO standards at reduced rates. These customized wheelchairs are durable, cost-effective and comfortable to patients.

Happy to be a part of the organizing team of **Trivandrum physiatrists club.** The **academic meeting** for month of February was conducted on 26th Feb . The talk by Dr. Surendran. A sir on “Rheumatoid hand” followed by clinical case discussion in “hits and misses” session by Dr. Unnikrishnan sir gave us valuable take home messages. The program was well attended by PG residents and physiatrists of Trivandrum.

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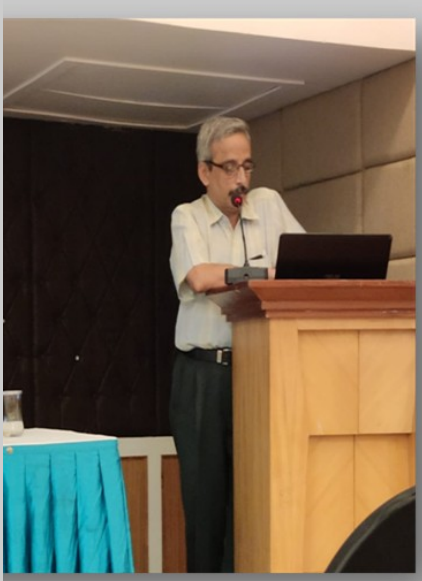


Dr. Surendran. A sir receiving a memento from Dr. Ramaswamy Pillai sir during the Trivandrum physiatrists club monthly meeting held on 26th February 2020

# Authors wanted

## Clinician

The ''cold call'. Comment on your approach and follow-thorough for a specific issue in patients with Spinal Cord Injury. Focused history, relevant exam, DDs, treatment plan versus current guidelines, follow-up till treatment end.
Case reports in Spinal Cord Injury
Quantify this- Name a scale you use regularly in Spinal Cord Injury and what is good/ bad about it in detail.

## Life long learner

What's new in Spinal cord injury rehabilitation that you find interesting?


## Leader & Team member

'When do you refer your patients with Spinal Cord Injury?' Algorithms with objective measures are preferred.

## Communicator

Resident's corner/ Things I learned after residency- How an event shaped you as a doctor/ humorous stories from work
Members in action- show us your professional activities since the last issue
Comments/ responses to the prior articles

## Professional

Respond to the following query. 'What have you done to make Spinal Cord injury rehabilitation better in your workplace?'