

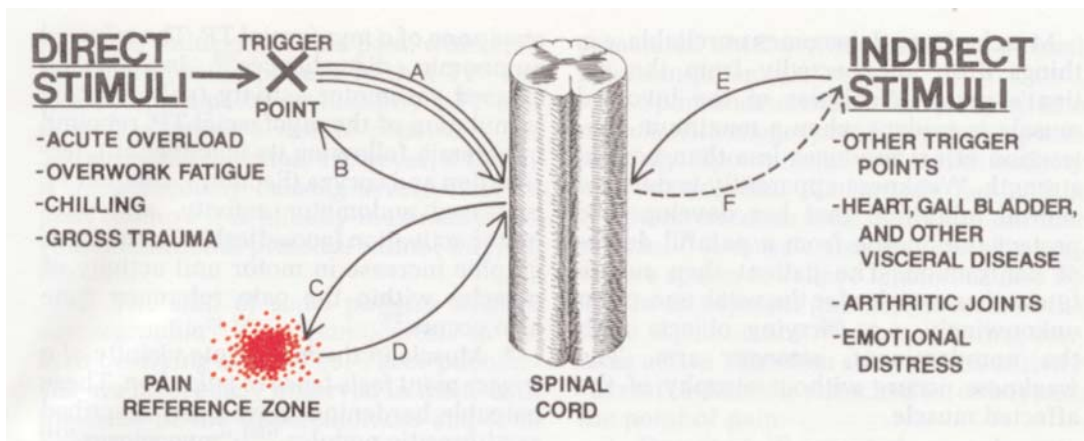
Myofascial Pain Syndrome (Myofascial Syndrome)

What is It and How to Treat It

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What is it?

Myofascial Pain Syndrome (MPS) is an autonomic phenomena referred pain from active myofascial trigger points with associated dysfunction. The MPS has a distinct epicenter, called a Trigger Point (TP) which causes the pain and/or referred pain pattern unique for that muscle point.



Definition and Characteristics of a Myofascial Trigger Point (TP)

1. A hyper-irritable spot in the muscle which is the origin of the patient's pain symptoms.
2. The TP is usually within a taut band of the skeletal muscle or in the fascia.
3. When the TP is compressed it is painful where as a normal, healthy muscle will have a pressure sensation associated with the palpation pressure.
4. The TP gives rise to a characteristic referred pain pattern, tenderness and an autonomic phenomena.

A practitioner should be on the alert during the history, exam and subsequent treatments to the possibility that the patient's chief complaint is due to Myofascial Trigger Points. If the chief complaint of pain has a TP origin, the specific muscle or muscle group that causes the symptoms should be identified and treated.

Types of TP Found Upon Examination

The patient has potentially six types of TP, which are 1) Active, 2) Latent, 3) Primary, 4) Associated, 5) Satellite and 6) Secondary.

1) Active Myofascial Trigger Point (TP):

It is a focus of hyper-irritability in a muscle or its fascia which is symptomatic with respect to pain. The Active TP refers a pattern of **pain at rest and/or on motion** that is specific for the muscle.

Characteristics of Active Myofascial (TP)

1. The TP is always tender with and without palpation
2. The TP prevents full muscle lengthening when trying to elongate the muscles origin and insertion.
3. When strength testing the muscle with a TP, the muscle will test weak relative to a muscle without a TP
4. When direct compression is applied to the TP, there is usually referred pain from the TP
5. When palpating the TP, there is a local twitch response of muscle fibers
6. The TP produces a specific referred autonomic phenomena to its pain reference zone which is unique for each TP

2) Latent Myofascial Trigger Point (TP) (Clinically Silent)

The Latent TP is a focus of hyper-irritability in a muscle or its fascia, similar to the Active TP, but the Latent TP is **clinical quiescent with respect to spontaneous pain**. The Latent TP is painful only when palpated, not at rest and/or on motion as in the Active TP. This is a distinction to remember when differentiating between Active and Latent TP. The Latent TP may have all the other clinical characteristics of an Active TP. The Latent TP is predisposed to acute attacks of pain due to minor over stretching, overuse, or chilling.

3) Primary Myofascial Trigger Point (TP)

This is a hyper-irritable spot within a taut skeletal muscle band which is activated by acute or chronic overload (mechanical strain) of the muscle. It is NOT activated as a result of trigger-point activity in another muscle of the body (a secondary and satellite trigger point).

4) Associated Myofascial Trigger Point (TP)

The Associated Myofascial (TP) is also hyper-irritability in a muscle or its fascia which develops in response to A) compensatory overload B) shortened range C) referred phenomena caused by trigger-point activity in another muscle. Other types of the Associated Myofascial (TP) are Satellite and Secondary TP discussed below.

5) Satellite Myofascial Trigger Point (TP)

The Satellite TP is hyper-irritability in a muscle or its fascia that becomes active due to

the muscle being located within the pain zone of reference of another trigger point. This TP becomes active when a Primary TP refers pain to the area of the Satellite TP which in turn radiates pain to its referred pain zone. This Satellite TP is to be distinguished from a secondary trigger point below.

6) Secondary Myofascial Trigger Point (TP)

The Secondary TP is a hyper-irritable spot in a muscle or its fascia which becomes active because its muscle was overloaded in A) synergist substituting or countering the tautness or B) antagonist countering the tautness of the muscle that contained the primary trigger point

Note: Synergistic Muscles are muscles that reinforce each other when they contract, where as the Antagonists Muscle, or portion of muscles, when contracted, develop forces that oppose each other.

Background of Myofascial Trigger Point

The Skeletal muscles in the body are voluntary. One has to initiate the motion -- unlike the smooth muscles of the digestive track or the cardiac muscle of the heart which perform their function without any conscious effort.

Skeletal muscles are the largest single organ of the human body composing up to 40% or more of the body weight. According to Basle Nomina Anatomica, there are 347 paired and 2 unpaired muscles (696 total). However, according to Basle Nomina Anatomica Convention, the body has 200 paired muscle (400 total). The difference depends on the standard or convention when categorizing the muscles.

The muscles of the body are often overlooked by physicians like orthopedists, rheumatologists, family practitioners, internists, etc. who concentrate their attention to bones, joints, bursae and nerves.

This is unfortunate since Myofascial TPs are extremely common and become a distressing part of nearly everyone's life at some point. The Latent TPs described above, are more common than Active TPs which cause stiffness, and restricted ROM. Researcher Sola et al. found in 200 asymptomatic young adults, latent shoulder girdle TPs in 54% female and 45% male subjects with 5% having referred pain.

In Hospitalized and Ambulatory Physical Medicine and Rehabilitation Service among patients with fibrositis syndrome (TPs), the greatest number showing TPs were between 31 to 50 years of age. The study conclusion: A) Individuals in mature years with maximum activity were most likely to suffer from the pain syndromes of Active TP where as B) Individuals at an advanced age with reduced activity had more prominent stiffness and restricted ROM from latent TPs than pain.

Pain Severity from TPs

The pain severity caused by TPs ranges from painless restriction of motion due to latent TP is more common among older individuals who are living a more sedentary lifestyle and due to the lack of physical demand on the muscles than younger individuals in earlier years who experience agonizing and incapacitating pain due to an active TP. Therefore, the patient can have quite a range of pain possibilities. The pain can be just as severe as heart attack, broken bones, renal colic, etc but a TP is not life threatening per se.

Cost Associated with TP

The unrecognized TP that becomes chronic is a major cause of lost work time. Compensation for this lost work is estimated to be in the billions of dollars annually (Bonica). Often, treatment for the chronic pain is analgesics -- which are costly, usually not effective in removing the pain symptom and a significant cause of patient neuropathy. A significant portion of TPs can be treated successfully when there is a correct diagnosis and treatment.

Patients with active TP pain may be ignored and labeled neurotic because the physician cannot find the visceral cause of the pain complaint. Remember, most physicians are looking for the bone, joint, bursa or internal organs to be causing the symptoms and not the muscles.

Confusion of Terms Associated with Myofascial Trigger Points

Many authors have used different terms, from late 1800's until today, to mean the same entity. Some of the terms include: mitischronica, rheumatic myositis, pressure point, chronic rheumatism, nerve point, nodular fibromyositis, myogelosis, muscle hardenings or indurations, myofascitis, myofibrositis, myositis, fibropathic syndromes, hypersensitive areas, myodesneuria, interstitial myofibrositis, chest wall syndrome.

Synonymous Terms for Myofascial TP

Sometimes, terms will be used synonymous with TP and at other times have different meanings. For example fibrositis has five different meanings in the research literature:

Fibrositis:

Five different meanings

1. Muscular rheumatism (TPs)
2. Psychogenic Rheumatism
3. Rheumatology text definition
 - A. Widespread aching of more than 3 month's duration
 - B. Local tenderness at 12 of 14 specific sites
 - C. Skin roll tenderness over the upper scapular region
 - D. Disturbed sleep with morning fatigue and stiffness
4. Panniculosis or panniculitis
Circumscribed subcutaneous tenderness and induration

- seen over the back of the shoulder and pelvic girdles
5. Disorders of Connective Tissues
Tendonitis, bursitis, capsulitis, tenosynovitis

Clinical Characteristics of TP

Hyper irritable locus within a taut band of skeletal muscle
Located in the muscular tissue and/or its associated fascia
Painful when compressed
Evoke a characteristic referred pain and autonomic phenomena
Myofascial TP is distinguished from a TP in other tissue (skin, ligament, periosteum)

Classification of TPs

Myofascial TPs can be classified as A) **Active** which cause the patient pain or B) **Latent** which is clinically silent regarding pain, but may cause restriction of motion and weakness of affected muscles and may persist for years after apparent recovery from injury. Latent TPs predispose the patient to acute attacks of pain from minor over stretching, overuse, or chilling of the muscle area.

Both Active and Latent TPs cause dysfunction, but only **Active TPs cause pain with rest and activity.**

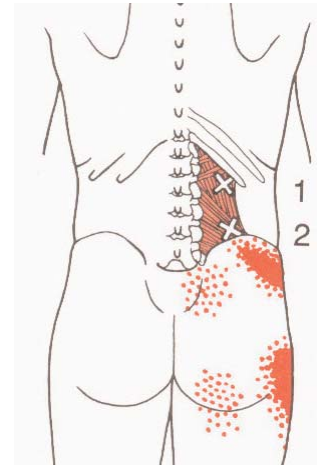
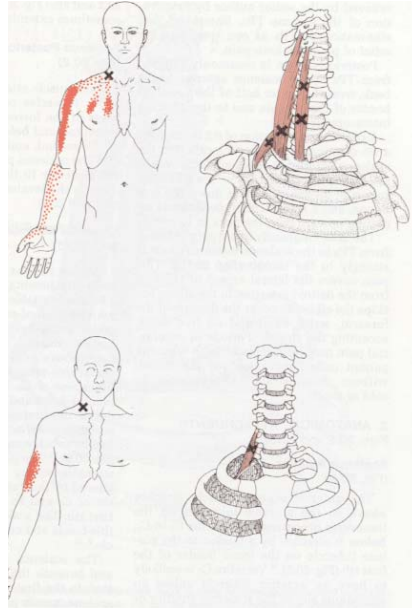
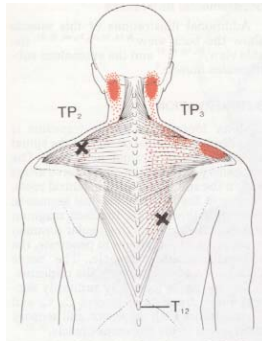
Normal muscles do not have TPs. There are NO taut bands of muscle fibers; NO tenderness to firm palpation (should only feel like pressure when palpated); NO local twitch response; NO referred pain in response to applied pressure.

Myofascial TPs affect both male and female, at any age. However, sedentary, middle-aged women are more vulnerable (except in later years). Women are more likely than men to seek treatment for pain of myofascial origin. Infants have been observed to have TP of the rectus abdominis muscle and have associated colic. Patients are more likely to develop active TP with increasing age into the most active, middle years. TPs can also occur in later years with less strenuous activity, and gravitate towards latent TP with restricted motion and stiffness

Those who are inactive with periods of vigorous physical activity are more prone to develop active TP than those who exercise their muscles heavily every day

Common Muscle Groups Affected

The TPs are most likely to develop in postural muscles of the neck, shoulder and pelvic girdles and the masticatory muscles. (Common muscles include: upper trapezius, scalene, sternocleidomastoid, levator scapulae, and quadratus lumborum)



Symptoms Associate with Myofascial TP

1. Each TP has a specific referred pain pattern for each muscle. Spontaneous pain is rarely located at the TP, but in a referred pain zone. The pain quality is usually described as dull and aching and often deep (sharp/stabbing/knife like). The pain severity ranges from low-grade discomfort to severe and incapacitating torture. The pain may occur at rest or only with motion. With digital pressure on (or needling) the TP usually elicits the referred pain. TP pain is rarely completely symmetrical on both sides of the body – an important point to remember clinically. If the initial TP is inactivated first, the patient may recover without treating the satellite TP. The TP referred pain does not follow simple segmental, or neurological, or visceral origin patterns. TP pain frequently, but not always, occurs within some dermatome, myotome or sclerotome (not necessarily the entire segment).
2. TPs are activated directly by acute overload, overwork fatigue (sustained contraction), direct trauma and chilling. There may be an acute cause weeks, months or years before the onset of pain symptoms.
3. TPs are activated by A) Other TPs B) Visceral disease C) Arthritic joints or D) Emotional distress. Satellite TPs tend to develop in muscles within the pain reference zones of other TPs or pain referral zones of diseased organs such as myocardial infarction, peptic ulcer, cholelithiasis or renal colic, etc.

Secondary TPs usually develop in synergistic muscles that are chronically overloaded by protective spasm, maintained to reduce strain on the first muscle that is hypersensitive, shortened and weakened due to the primary TP.

4. Active TPs vary in irritability from hour-to-hour and from day-to-day
5. TP irritability may be increased from a latent to an active level by many factors. Depending on the degree and conditioning of the muscle. The greater the muscle exercise tolerance, the lower the susceptibility of TPs to activation. Situations which may cause a latent TP to become Active TPs can occur with A) leaving the muscle in a shortened position for a period of time (e.g. Sleeping with a neck muscle in a contracted position), or B) chilling the muscle (including drafts), or C) when the muscle is fatigued or, D) post exercise stiffness or, E) during or following a viral illness or, F) sudden shortening of a muscle that has a TP.
6. TP signs and symptoms activity outlast the precipitating event which triggered the TP pain referral. The muscles with TP guard against the pain by limiting the involved muscles motion. Active TPs may become latent by removing the precipitating factor and resting the muscle.
7. TPs may cause symptoms other than pain. TPs may cause A) Localized vasoconstriction, B) Sweating, C) Lacrimation, D) Coryza, E) Salivation, F) Pilomotor activity, G) Imbalance due to proprioceptive disturbances such as dizziness, tinnitus or distorted perception of the weights of objects lifted in the hands, H) Muscles in the referred pain zone may have increased excitability causing disturbance of muscle coordination. For example, TP of soleus muscle will show depressed an ankle tendon jerk reflex suggesting a nerve root compression when it is not. TP of vastus medialis may inhibit the quadriceps function causing knee buckling. I) TMJ dysfunction and pain has disco-ordination in EMG disrupted sleep due to the recumbent position places pressure on the TP.
8. TP causes stiffness and weakness of the involved muscle most noticeable after a period of inactivity – especially after a night's sleep or sitting too long. The strength tests can prove to be unreliable, due to the shortening of the muscle causing weakness, giving the practitioner an incorrect sign that the weakness is from a nerve root compression.

Examination Findings Associated with TPs

1. Active or Passive stretching of the muscle with active TPs increase the pain. The pain at the stretch causes more muscle tension and increases more pain due to activation of the TP.
2. The stretch ROM is restricted, causing forced stretching attempts to be very painful.

3. TPs cause increased pain when the affected muscle is strongly contracted against fixed resistance.
4. Maximum contractile force of an affected muscle is weakened when there is a TP present. This usually is demonstrated with muscle testing.
5. Deep tenderness and dysesthesia are commonly referred by active myofascial TPs to the referred pain zone. Sensory changes in the referred pain zone can be confusing to the practitioner.
6. Disturbances of non-sensory function are sometimes induced in the pain reference zone of a TP. There may be A) Increased vasomotor activity (pallor, rebound hyperemia), B) Lacrimation and coryza, C) Increased sudomotor activity.
7. Muscles in the immediate vicinity of a TP feel tense to palpation and are described as fibrositic nodules, myogeloses, ropiness, or tense palpable bands.
8. TP is found in a palpable band as a sharply circumscribed spot of exquisite tenderness. The point of maximum tenderness is on the TP. Palpation off the TP has less tenderness.
9. Digital pressure applied to a TP elicits a "jump sign" where the patient may cry out and/or moves away.
10. Performing a snapping palpation of the TP evokes a local twitch response
11. Moderate and sustained pressure on an irritable TP intensifies the referred pain. It also occurs with needle penetration.

Laboratory Findings of Patients with Myofascial TP

1. Routine lab tests show no abnormality. The ESR, SMA, CBC and Muscle Enzymes are normal. The radiograph of soft-tissue technique and CT do not show TPs. The joints and bones are not remarkable for the pain experienced by the patient.
2. EMG of involved muscles at rest reveals no diagnostic abnormality.
3. Spontaneous motor unit activity in a muscle with trigger points can develop secondarily.
4. Thermograms of skin overlying active TPs have recently been reported to show areas of increased skin temperature 5-10 cm in diameter
5. Increased skin conductance (reduced skin resistance) may be observed over a trigger area.

Perpetuating Factors of Myofascial TP

For most conditions, time will allow for recovery but not for MPS. The recovery depends on the practitioner to **IDENTIFY AND ELIMINATE THE CAUSE OF THE TPs**. The practitioner can treat often for the pain but until the **CAUSE (Perpetuating Factor) is REMOVED**, the pain will persist. If the cause is poor biomechanics, poor posture, ergonomics, etc. this must be addressed to provide longer term relief.

In some instances, positive local TP treatment is often immediate. This includes removal of spot tenderness, elimination of referred pain, elimination of local twitch response, increased muscle motion, increased AROM and less palpable muscle tension in the band.

If the TP has been present for months or years, several treatments may be needed due to the chronic nature of the condition. If the muscle band is not returned to normal full length, incomplete relief and referred pain from the TP continues. Immediately post TP treatment, the application of hot packs to the muscle should be applied for a few minutes, if there is cooling from the vapocoolant spray used during treatment. If there is inflammation (heat and swelling of the area), ice therapy may be needed. After treatment, there is usually increased ROM and reduced muscle soreness

Relief is longer lasting if the patient moves ALL the treated muscles through several cycles of their full ROM at the end of therapy. If the patient guards or restricts motion, the TP activity will return.

Misconceptions about MPS

1. The pain from TPs are solely psychogenic in origin

Most physicians do not examine for TPs and rely on the radiographs and laboratory findings for the cause of pain. When these test are normal, the physician concludes erroneously that there is no organic basis for the pain, therefore it is psychogenic.

2. MPS is self-limiting and will cure itself

It is thought that at best, an active TP will spontaneously reduce to a latent TP only to be reactivated by some minor stress. This is not a true statement. TP not addressed with treatment will not resolve, but will become a life long issue.

3. MPS is not severe and is not taken seriously

Usually TPs are not life threatening, however, there have been reported cases of drowning from cramps due to TPs, suicides caused by chronic TP pain, or TP causing low back pain as a major factor for work loss.

4. Pain relieved by TP treatment rules out visceral disease

If the TP pain is caused by visceral pathology like angina, acute abdominal disease, or myocardial infarction, the application of vapocoolant spray or local anesthetic onto the pain zone can temporarily relieve the pain, but will not change the visceral cause. The practitioner should be alert to the possibility that the pain from TP may be an indication that there is visceral pathology to be addressed.

Patient Examination

The practitioner should conduct a general examination with special attention to the neurological functions. Also, the examination should include a thorough examination for patient for TPs.

Inspection

During the examination, observe the patient's mobility and posture. Does the patient have spontaneous posture and movements with walking, sitting or removal of articles of clothing? People with TP tend to move slowly and protectively. Does the patient use the arms and hands bilaterally in their full ROM? Does the body, instead of the head, turn when the patient looks around? In sitting and standing position, is one shoulder lower or higher? Is the face symmetrical? Does the patient do spontaneous stretches for relief? Which muscles? Standing and sitting posture provides clues as to which muscles are shortened.

Neuromuscular Functions

Weakness and Restriction of Movement

Passively stretching the muscle with a TP or actively contracting it in the shortened position causes pain. The muscle strength testing is weak with the affected muscle with a TP, due to the muscle shortening and pain. There is painful loading of the muscle. When there is inactivation of the TP, there is an increase muscle strength when tested.

Weak Deep-tendon Reflexes

TPs can reduce the briskness of a deep-tendon reflex, giving a false positive for nerve root compression. For example, TPs in the soleus muscle may reduce at DTR response in an ankle jerk.

Cutaneous Signs

The presence of TPs can cause panniculosis, a peculiar, mottled, dimpled appearance of the skin, indicating loss of normal elasticity of the subcutaneous tissue. One may try Skin Rolling to help evaluate whether the panniculosis is from TP or some other pathological origin.

Compression Test

There may be pain only during movement and not at rest. Manually compressing the muscle responsible for the movement while performed, reduces the referred pain. Squeezing a roll of the skin overlying the involved muscle between the thumb and fingers can block the referred pain

Laboratory Tests

Consider ordering laboratory tests if the patient's pain appears to be coming from a visceral, endocrine or metabolic disorder. Some of the laboratory tests to consider are:

Hematologic Profile

ESR – to eliminate chronic bacterial infection
Anemia
Eosinophilia – active allergy or to infestation of intestinal parasite
Mononuclear cells – low thyroid function, active infectious mononucleosis or active viral infection

Blood Chemistry

Increased cholesterol from decreased thyroid function
Low serum cholesterol may be due to folate deficiency
Elevated uric acid due to hyperuricemia (may be gout)
Low serum total calcium suggests calcium deficiency
Low serum potassium can cause muscle cramps
Elevated fasting blood sugar levels need follow up tests to rule out diabetes
Hypometabolism (Thyroid Disease)
TSH, T3, T4, T-RIA
Hypoglycemia
Gouty Diathesis – More susceptible to TPs

Vitamin Tests

Thyroid Tests (when indicated by history and physical findings)
T3, T4, TSH, T-RIA

Diagnostic Imaging

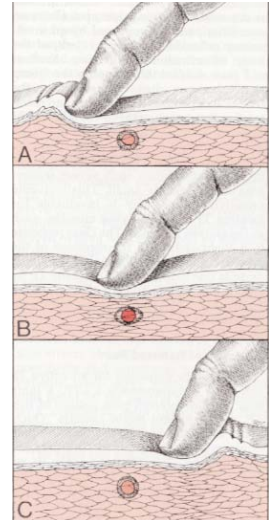
NCV to rule out diabetic neuropathy
Radiographs to rule out bone pathology

Trigger Point Examination

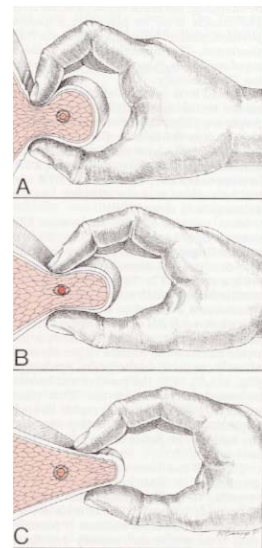
Palpation of the TP is required to confirm, A) Taut bands, B) a Twitch response. Also, palpation may severely exacerbate the patient's referred pain activity for a few days. The recommendation is to palpate those muscles one can treat that day. Warn the patient after the treatment that soreness is to be expected for the next few days.

Types of Palpation to Evaluate TP

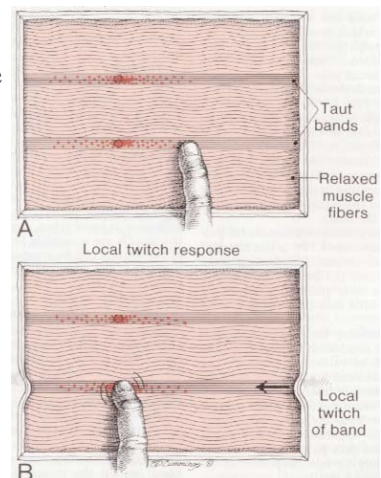
Flat Palpation: This is the moving the subcutaneous tissue over the muscle fibers by using the fingertip.



Pincer Palpation: Is the grasping of the muscle belly between the thumb and fingers and squeezing the fibers between them (ex: SCM).



Twitch Response: There may be a local twitch response which is observed when rolling the TP with fingers. The twitch response may be present with needle insertion.



Induction of Referred Pain:

Palpating the TP, feeling the local twitch response, observing the jump sign, and the patient stating that it reproduced the referred pain.

Entrapments

When a nerve passing through a muscle between taut bands, or a taut band and bone, an entrapment may occur, which can cause a loss of nerve conduction (neurapraxia).

List of Nerve Entrapments	
Nerves Involved	Muscles Involved
Supraorbital	Frontalis
Greater Occipital	Semispinalis Capitis
Brachial plexus, lower trunk	Scaleni
Sensory radial	Brachialis
Radial	Triceps brachii
Deep radial	Supinator
Ulnar	Flexor carpi ulnaris
Digital	Interossei
Brachial plexus	Pectoralis minor
Posterior primary rami	Paraspinal muscles

Treatment Options

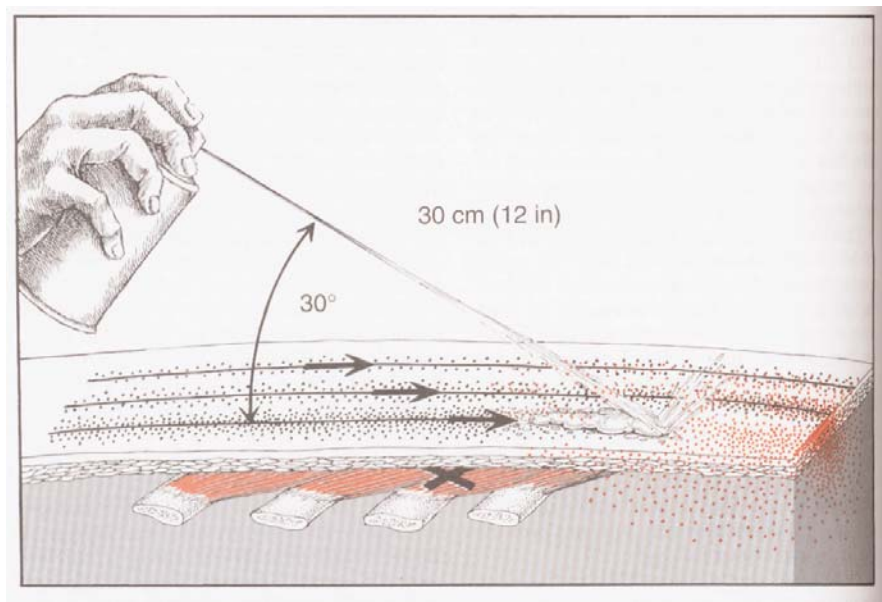
The following is a list of treatment options for treating Myofascial Pain Syndrome Trigger Points. Depending on the patient's health history and examination, response to previous treatment, and skill and preference of the practitioner, one or more of these may be selected on any one visit, or over the course of treatment.

Post Treatment Instructions

After the treatment, instruct the patient to avoid strenuous activity, change precipitating activity or mechanics, and perform the home stretches to elongate the contracted muscles (which may include but not necessarily needed, stretching in the pool with body supported by the water).

1. Spray and Stretch

Spray and Stretch is the application of vapocoolant spray, preferably Fluori-Methane (which is not as cold as Ethyl Chloride and not flammable and explosive). Hold the Fluori-Methane approximately 12 inches from the area to be sprayed, and at 30 degree angle to the body area. The spray is the distraction, the stretch is the action. After spraying the area with several sweeps, the practitioner stretches the affected muscle to elongate the TP and reduce or eliminate its symptoms. Repeat several times in one session. Avoid over cooling the skin with too many applications of the spray. Conclude, after the session, with moist heat to the area.



2. Heat

Dry heat applied to TP is not as effective as moist heat, since dry heat pulls moisture out of the area in turn causing more swelling to occur. The preferred treatments should be a hot tub, hot baths, hot showers or moist hot packs. The heat reduces post exercise stiffness and warms the area post spray and stretch application. Note: Application of heat post TP treatment may not be indicated if there is inflammation with associated heat and swelling of the muscle treated. In this case, cold packs are preferred to reduce inflammation, to reduce muscle swelling, and to allow other TPs to reveal themselves at the next visit evaluation.

3. Injection and Stretch

Stretching the involved muscle allows more of the muscle TPs to be addressed than injection alone. Usually 0.5% procaine in isotonic saline is used for the injection site. Following the injection, stretches of the muscle are performed.

4. **Ischemic Compression**

Ischemic compression is the sustained pressure to the TP with sufficient force and for a long enough time to inactivate it. It stretches the muscle to the point of discomfort. The practitioner applies pressure using his thumb (or finger) which presses directly on the TP to create a tolerably painful sustained pressure. Do not allow the patient to tense the muscle when this technique is applied. As the TP discomfort lessens, more pressure is applied to the TP. There is approximately 1 minute of pressure with 20 to 30 lbs of pressure.

There are two methods of ischemic compression. A) Deactivate the TP in one treatment, which is effective on recent moderate TPs, or B) Deactivate the TP in a series of small steps over several days, which is effective with chronic and very hyper-irritable TPs.

5. **Massage**

Massage can cause increased hyperactivity of the TP, but it was found to be more effective than heat alone. Using a firm, heavy, friction type of massage is more effective than the stroking or kneading. The Stripping Massage technique is applied slowly and deeply. The muscles treated are completely relaxed and under moderate stretch by the practitioner. The skin is lubricated, and the practitioner's thumbs and fingers are placed on the distal end of the muscle. A slow sliding motion along the muscle length toward the TP (1 inch/3 seconds) is performed. Light pressure on the first pass with increased pressure on successive passes is conducted. The TP will feel like a lump obstruction. As the TP returns to normal muscle tone, the lump will become less palpable.

6. **Stretches**

One characteristic of the TP is a shortening of the involved muscle. When stretches are applied, there may be increased pain due to activation of the TP. Using the patient's pain as an indicator, stretches are an effective treatment tool for TPs. Several different stretching methods may be used to treat the affected muscle.

Passive Stretches are used on newly active, moderately irritable TPs. The practitioner stretches the muscle to the point of moderate pain.

Rhythmic Stabilization

Alternate contraction of agonist and antagonist muscle groups are resisted by the therapist. The practitioner keeps the patient's muscles stretched isometrically at the limit of their range.

Contract Relax Method

The practitioner stretches the patient's muscle to a comfortable limit of its range. The patient exerts minimal voluntary effort to contract the affected muscle. The patient holds the contraction for 10 seconds with the therapist resisting the effort isometrically. The Patient relaxes. When completely relaxed, the therapist passively, gently stretches the muscle a little farther until it meets resistance. This is repeated three times in one session with increased ROM of the joint/muscles stretched.

7. Ultrasound

There are two different options with the use of ultrasound to treat TPs.

Option 1

Use 0.5 watt/cm² with slow dwell technique and circular motion. The frequency is 1 or 2 revolutions per second. The circle is to overlap the TP in the center of the circle

Option 2

The power is increased to threshold pain level (1.5 watt/cm²). The power is then reduced to one-half of that intensity. The next 2 to 3 minutes intensity is increased with patient feedback of pain threshold. Do not go beyond the original pain threshold level

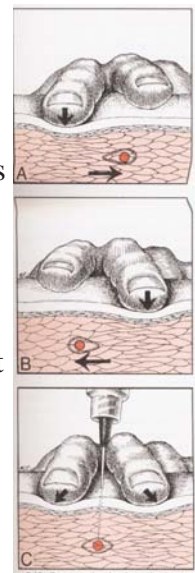
Note: The treatment may include electrical stimulation with the ultrasound

8. Spinal/Joint Manipulation

Mobilization of fixated joints reduces local muscle spasms and TPs.

9. Acupuncture / Electro-acupuncture

The practitioner locates the TP by palpation using the index and middle finger, or pinched between the thumb and index finger (easier if there is no local swelling of the muscle band). The TP is needled directly in the center, other needles are applied at the 12 O'clock, 3 O'clock, 6 O'clock and 9 O'clock positions. There are also needles inserted into the beginning and end of the local muscle shortening. Electro-stimulation of a frequency of 100 Hz, intermittent to constant mode, with the intensity brought to patient tolerance can be used, but is not required, with the treatment.



10. Ice Therapy

The patient applies ice to the treated area at home at least 5 times in 24 hours. Application is performed 5 to 20 minutes depending on muscle size in the area. In between applications, the patient waits at least 60 minutes before re-application. The area should become numb, not burn the skin, but to allow for the four feelings of ice to take place to the area (initially Cold, which becomes Burning, then Aching, and finally Numb sensation to the area. Follow up treatment will sometimes reveal other TPs which were covered by the swelling and not detected on the previous visit. The ice allows for more precise treatment applications on subsequent visits.

11. Home Stretches and Exercises

Correct any patient's postural imbalances which are the cause or precipitating factors of the TP. Correcting poor ergonomic biomechanics (home, work, car, sitting, etc.) is key. Address any weak or taught muscle groups to balance the involved muscles and joints. Stretch the shortened muscles (contract relax method) on the first visit. Instruct the patient to continue stretches at home. At the next visit, if the shortened muscles are stretched, show strengthening exercises of the weak muscle groups (antagonist) to the patient.

12. Structural Inadequacies

Search for possible structural inadequacies such as
Anatomical short leg (up to 1/4" difference)
Incorrect fitting furniture (ergonomics)
Poor posture (reading, sitting, computer, driving, etc.)
Abuse of muscles

13. Nutritional Inadequacies

In most cases, vitamin and/or mineral/trace elements may be deficient. Consider adding to the persons diet the following:

Vitamin Deficiencies
B1 (thiamine)
B6 (pyridoxine)
B12 (cobalamines)
Folic Acid
Vitamin C

Dietary Minerals and Trace Elements

Calcium

Iron

Magnesium

Potassium

Suggested Treatment Steps

Assuming the TPs present are not due to other underlying metabolic, neurologic, viral, bacterial osseous, etc. pathology, the following is a suggested treatment of TPs. It is a guideline. The practitioner should vary and change treatments based on the patients history, examination, laboratory and imaging findings and response to care.

Visit Number 1

Acupuncture (with or without stimulation) to the TP's

When needling, try to reproduce the referred pain.

Use the pinching technique to stabilize the TP when inserting the needles in the 12 O'clock, 3 O'clock, 6 O'clock, 9 O'clock positions and both ends of the taut band.

If electro stimulation is used, connect the positive and negative clamps to the needles at the beginning and end of the taut band. (Frequency: 100 Hz, Intensity to patient tolerance, Intermittent or constant mode).

Treatment time: 10 to 20 minutes with occasional stimulation of the needles.

After the needles are removed:

Massage

Lightly massage the muscle in the lengthened position for a few strokes. Passively move (pumping) the muscle through its range of motion, just to discomfort, with each massage stroke while moving the muscle from shortening to lengthening.

Increase the range of muscle motion and increase the contact pressure to the patient's tolerance while continuing to passively move the muscle through its range of motion.

Continue motion to a quick three stroke "stripping" of the muscle TP

Stretch

Stretch the muscle with the TP and any other shortened muscles by using the (Contract Relax Method).

Give the patient Home Stretches.

Spinal Manipulation (chiropractors and osteopaths)

Affected joints

Ice Treated Area

Apply for 5 to 20 minutes, depending on muscle size in the area

Home Instruction for Ice

Done at home after the treatment

5 times in 24 hours

Remove for at least 60 minutes

Do not burn the skin, but allow for the four feelings of ice to take place (Cold, Burning, Aching, Numb)

Follow up treatment will sometimes reveal other TPs covered by the swelling, allowing for more precise treatment applications on subsequent visits.

Evaluate Any Biomechanical Precipitating/Perpetuating Factors

Ergonomics at work, home car, computer, etc.

Posture

Sitting (legs crossed, slouching, etc.)

Structural Short Leg

Poor or worn footwear

Hemipelvis

Evaluate Nutritional Deficiencies

Make any recommended dietary or vitamin/mineral suggestions

Caution the patient that they will most likely be more sore the next morning.

Continue the icing the next day.

Follow up in two days.

Visit Number 2 (two to three days later)

Review the number of times and accuracy of home icing.

Review the number of times stretches were performed.

Changes in the biomechanics and/or perpetuating factors

Re-evaluate the TP

Frequency, Intensity and Duration of the Pain

Precipitating factors

Area for reduced swelling and location of the TP s

Continue with the same steps of the first visit.

Add exercises to strengthen weak muscles

Reinforce doing the home ice, stretches, exercise, dietary changes and biomechanical modifications

Visit Number 3 (two to three days later)

Re-evaluate the TP

Pain Frequency, Intensity, Duration

Activities that precipitate the pain

Same as visit number 1, but move into heat therapies instead of ice.

Finish using ice to the area.

Home instructions

Continue the stretches, exercises, dietary changes, biomechanical modifications.

Moist heat at home to the area.

Only apply ice if the condition flares-up

Follow-up if the condition has not resolved.