

Myofascial Pain Syndrome

A common pain syndrome of muscle pain caused by myofascial trigger points (MTP) within taut bands of skeletal muscle fibers. Treating the underlying etiologic lesion responsible for the MTP is the most important strategy in MPS therapy. Treatment options include: manual therapies, physical therapy, dry needling or MTP injection (with bupivacaine or botox).

DIAGNOSTIC CRITERIA

- Myofascial pain syndrome is a pain phenomenon caused by the activation of latent MTPs due to certain pathologic conditions, including chronic repetitive minor muscle strain, poor posture, systemic disease or neuromusculoskeletal lesion (sprain, strain, arthritis, enthesopathy or vertebra disc lesion)
 - Association between active MTPs and:
 - OA of knee
 - Cervical disc lesions
 - Cervical facet lesions
- Myofascial Trigger Point definition:
 - A hyperirritable spot in a taut band of skeletal muscle fibers
 - Latent MTP (tender but not spontaneously painful) can become an active MTP (tender and spontaneously painful) secondary to a pathologic lesion
 - After appropriate treatment of the lesion, the activated MTP can be suppressed to its inactive state (however the MTP never disappears and is only converted from active to latent).
- Myofascial Trigger Point Characteristics:
 - Compression of myofascial trigger points can reproduce or aggravate a patient's usual complaint (pain recognition)
 - Inactivation of the MTP can relieve symptoms of discomfort
 - Similar referred pain patterns can be elicited in different patients by compression of MTP in each individual muscle
 - High pressure stimulation (including deep-pressure massage and needling) to the MTP can suppress the pain
 - Needling to the tiny loci (nociceptors, defined as local twitch response (LTR) loci or sensitive loci) in the MTP region can induce pain and referred pain as well as LTR that can be recorded on EMG
 - All MTPs are located within the endpoint zone and endplate noise can be recorded more frequently at an MTP region than at a region with normal muscle tissue
 - Immediate relief of MTP pain can be achieved if LTRs are elicited during needling of the MTP

ANESTHETIC GOALS:

- Chronic Pain Management: biopsychosocial model of therapy
- Primary goal: Treatment of the underlying (etiologic) lesion can help to permanently inactivate the MTP
- If pain persists after treatment of the underlying lesion or if the underlying lesion cannot be treated appropriately :
 - Appropriate recognition of the active MTP causing the problem
 - Identification of key MTP: when an MTP becomes hyperirritable, other latent MTPs within the referred zone of the hyperirritable MTP may also become activated; these newly developed MTPs are known as satellite MTPs or secondary MTPs whereas the original one is known as the key or primary MTP
 - Conservative vs aggressive therapy: active MTPs should be treated conservatively (noninvasive) tx including physical therapy) before the consideration of aggressive therapy (injection and surgery).
 - Active vs chronic MTPs: at an acute stage, active MTPs should not be inactivated at an acute stage. Physical therapy to the etiologic lesion should be provided unless pain becomes intolerable, where inactivation of MTPs at an acute stage may be necessary.
 - Mild vs severe MTPs: inactivation of satellite MTPs can reduce the sensitivity of primary MTPs if severe MTP caused by CRPSI prevents the underlying lesion from being treated locally.
 - Superficial vs deep MTPs: deep pressure massage can be easily applied to superficial MTPs but not deep ones; deep MTPs should be treated with stretching or other methods such as ultrasound, laser, acupressure, acupuncture or local injection
 - Perpetuation factors: factors that may cause active MTPs to persist or aggravate MTP pain.
 - Patient education and home program: stretching, focal massage, local heat application and therapeutic exercise

PATHOPHYSIOLOGY

- Myofascial pain syndrome is defined as a regional pain syndrome characterized by muscle pain caused by MTPs. MPS may include a regional muscle pain syndrome of any soft tissue origin that is associated with muscle tender points or trigger points (MTP).
 - Activation of latent MTPs as a consequence of chronic repetitive minor muscle strain, poor posture, systemic disease or neuroMSK lesions
- MTP locus contains a sensory component and a motor component.
 - At the sensory locus, pain, referred pain and local twitch response (LTR) can be elicited when the locus is mechanically stimulated with adequate pressure; an LTR locus is a sensitized nociceptor
 - At the motor locus spontaneous electrical activity (including endplate noise and endplate spikes) can be found in EMG recordings; also defined as a spontaneous electrical activity (SEA) locus which is a dysfunctional endplate (secondary to excessive leakage of Ach in the endplate region- endplate noise recorded in this region can be suppressed with botox injection- the leakage of Ach molecules can cause focal contracture of the sarcomeres to form a contraction knot/taut band)
 - An SEA locus is in the closed vicinity of an LTR locus; they interact mutually for the formation of a taut band.

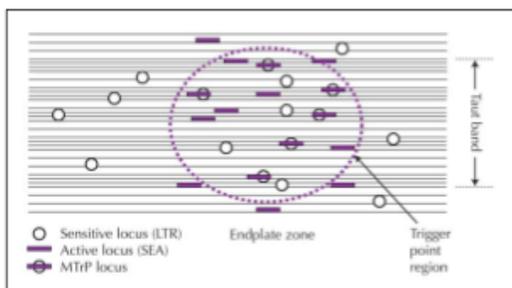


Figure 1. Multiple loci in an MTP. LTR—local twitch response; MTP—myofascial trigger point; SEA—spontaneous electrical activity.

- The irritability of an MTP is proportionate to the prevalence and the amplitude of endplate noise recorded from that MTP region
- Assessment of spontaneous electrical activity in an MTP region has been used to evaluate the effectiveness of a certain therapeutic method
- Referred pain and local twitch response are characteristics of the myofascial trigger point mediated via the spinal cord mechanism – the formation of a neural network with connections among dorsal horn neurons (an MTP circuit) – can send nerve branches to connect with other MTP circuitry corresponding to other MTPs; a latent MTP can become active in response to any related lesion in another site.
- **TREATMENT OPTIONS:**
 - Intermittent cold and stretch (Spray and stretch)
 - Deep pressure soft tissue massage
 - Trigger point pressure release
 - Postisometric relaxation
 - Manipulation
 - Thermotherapy
 - Ultrasound therapy
 - Electrotherapy
 - Trigger point injection
 - Dry needling – likely effective secondary to hyperstimulation analgesia; the strong pressure stimulation to the MTP loci can provide strong neural impulses to the dorsal horn cells in the spinal cord, which may then break the vicious cycle of the MTP circuit
 - Acupuncture
 - ? laser therapy (experimental)
 - ? botox injection – questionable efficacy

REFERENCES

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- Hong CZ. Treatment of Myofascial Pain Syndrome. Current Pain and Headache reports. 2006, 10:345-349.