

Myofascial trigger point

Myofascial trigger point (MTrP) is a characteristic change in local muscle tension. This change is not in the entire muscle or muscle group, but only in a certain portion or bundles of striated muscle. There is a 2-6 mm nodule in the bundle, which is painful to palpation.

Etiopathogenesis of emergence

Currently, the most recognized theory of MTrPs formation is the "Integrated trigger point hypothesis" by Travell and Simons (1). This theory describes the emergence of MTrP based on the dysfunction of a different number of neuromuscular plates of extrafusal fibers. A number of factors are the cause of the persistence of MTrPs, the most important of which are postural disorders, asymmetry of the locomotor system, but also some nutritional and metabolic deficiencies.

Individual MTrPs together with other functional changes often form functionally linked chains. The specific distribution of these chains is then tied to the localization of the sources of nociception and represents a protective postural pattern.

Clinical characteristics

Six criteria are used to diagnose MTrPs by palpation: stiff muscle bundle, painful point, local muscle twitch, referred pain, pain recognition, and avoidance response. Their English equivalents are also given in the headings of the paragraphs.

Tough muscle bundle (Taut band)

Intracellular calcium can be excessively released from the sarcoplasmic reticulum in response to trauma or abnormal stress. This leads to an uncontrollable shortening of sarcomeres and the formation of a rigid muscle bundle. A rigid muscle bundle is a precursor for the formation of MTrPs.

Painful point (Spot tenderness)

It is located in a stiff muscle bundle, and palpable compression can cause pain or local muscle twitching, see below.

Local muscle twitch (Local twitch response)

He considers it the most specific sign, confirming the presence of MTrP. This reaction is a local spinal reflex and is probably the result of stimulation of sensitized nociceptors in the MTrP region, to which those muscle fibers that control alpha motoneurons with dysfunctional discs excessively releasing acetylcholine respond preferentially. It is manifested by a brisk transient contraction of these muscle fibers of the stiff bundle.

Referred pain

Palpable compression of a painful point may induce local and/or referred pain. The pattern of transmitted pain is typical for each muscle, predictable and often does not follow the segmental innervation or area nervina of the location of the stimulus.

Pain recognition

It occurs in patients who usually suffer from myofascial pain syndrome caused by MTrPs. When palpating the pain, the patient states that it is "his usual" pain. This phenomenon is an important diagnostic clue for determining a particular MTrP as the source of pain.

Dodging reaction (Jump sign)

The patient withdraws from the stimulus that provokes pain from the MTrP. It can indicate the degree of MTrP sensitivity, but it also depends on the force of pressure exerted by the examiner.

Therapy Options

There are many options for MTrPs therapy and they can be combined with each other. All methods have a similar end effect to MTrP therapy, namely reduced acetylcholine release and correction of neuromuscular disc dysfunction.

Manual Therapy

- **Spray and stretch**

This method was described by Simons and Travel, it is a specific muscle relaxation. After applying a cooling spray to the muscle, it is passively stretched by a physiotherapist. This method has similar effects to PIR, see below.

- **Postisometric relaxation (PIR)**

It is a Lewit-modified technique of muscle contraction and subsequent relaxation, the effect of which can be increased for many muscles by coordinating breathing and eye movements.

- **Reciprocal Inhibition (RI)**

In reciprocal inhibition, the patient performs an isometric movement against the therapist's resistance in the direction of the antagonist of the muscle in which the MTrP is located.

- **Antagonistic-eccentric contraction (AEK)**

This method was developed by Dr. Alois Brugger. It is based on a similar principle as reciprocal inhibition, but instead of isometric eccentric contraction of the muscle antagonist with MTrP is used.

- **Deep massage**

A type of massage that focuses on the subcutaneous tissue and fascia. Higher pressure is used than in classic massage and it is also possible to massage with the forearm or elbow.

- **Ischemic compression**

This is pressure treatment directly on the MTrP, short-term ischemia will cause subsequent hyperemia. The principle of the barrier is used, where after finding the MTrP, we put our finger on the given point, and then we just wait and feel that the given point loosens and melts under our fingers, as if we put our finger on a bar of chocolate.

- **Chiropractic-based procedures - manipulation, mobilization**

Joint blockages are often associated with MTrP, this happens on the basis of an imbalance of vegetative mineralization in the vicinity of the joint blockage. Removing the blockage and restoring joint play does not necessarily lead to dissolution of MTrP, but it can make therapy combined with other methods more effective.

Physical Therapy

- **Thermotherapy**

The application of heat to the skin, subcutaneous tissue and muscles induces myorelaxation and reflex dilation of skin vessels, which leads to a reduction in irritability and hyperemia.

- **Ultrasound (UZ)**

Application of high-frequency mechanical sound waves causes heating of deep layers, which in turn leads to myorelaxation and reflex dilation of skin vessels.

- **Electrotherapy**

From this wide group of treatment methods, mainly dyadynamic, interference and Trabert currents and the method of transcutaneous electroneurostimulation (TENS) are used for the therapy of MTrPs. The advantage of electrotherapy is that, in addition to the thermal effect, it can also have an analgesic effect, by acting on the exteroceptors, which close the portal in the principle of the portal theory of pain.

- **Laser**

MTrPs therapy mainly uses a low-level laser, which supports cellular metabolism and thus helps in the regeneration of hypoxic muscle cells associated with a dysfunctional neuromuscular disc.

Dry needling

Dry needling therapy is mainly indicated for MTrP, which are not fully functionally reversible and therefore do not disappear after only reflex methods. The needle is applied precisely to the location of the MTrP, which is found by palpation.

Other

- **Global reciprocal inhibition, Dynamic neuromuscular stabilization, Brugger concept and others**

All these methods try to correct the muscle imbalance, during which there is an ideal distribution of the load between all muscle groups and between individual muscle bundles within one muscle. This prevents repetitive straining, which often leads to MTrP.

Combination

The methods can be combined both within one group, e.g. US + TENS in physical therapy, but also within several groups. It always depends on the physiotherapist which approaches he chooses.

Links

Resources

- SIMONS, D G – TRAVELL, J G. Myofascial origins of low back pain. 1. Principles of diagnosis and treatment. *Postgrad Med* [online]. 1983, vol. 73, no. 2, p. 66, 68-70, 73 passim, Available from <<https://www.ncbi.nlm.nih.gov/pubmed/6218489>>. ISSN 0032-5481.
- LEWIT, Karel. *Manipulační léčba v myoskeletální medicíně*. 5. edition. Sdělovací technika ve spolupráci s Českou lékařskou společností J. E. Purkyně, [2004?]. ISBN 80-866-4504-5.
- KOLÁŘ, Pavel. *Rehabilitace v klinické praxi*. 1. edition. Galén, 2009. 713 pp. ISBN 978-80-7262-657-1.